

Hatter

10-2-41

Riboflavin Assay No. 121

Gms. Sample 1.0000

Dilution 1 → 2.50 → 50

6/6/41
ms

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. Yeast	Avg. mcgms. / gm. Yeast
1	3.0	1.50	27.39	33.55	6.16	6.38	0.126	41.9	41.9
2	3.0	1.50	33.55	40.15	6.60				
3	5.0	2.50	40.15	48.70	8.55	8.64	0.240	48.0	
4	5.0	2.50	0.00	8.72	8.72				
5	7.0	3.50	8.72	18.73	10.01	10.15	~	~	
6	7.0	3.50	18.73	29.02	10.29				

Comment: Fermentation was set with source of NT- which had been diluted to 40 Bx (1:1) treated with wgt. of $(\text{NH}_4)_2\text{SO}_4$ equivalent to the amt. of H_2SO_4 used in distillery. After pasteurization, molasses was centrifuged and treated with NaOH to a pH of 5.00. After dilution to 10 Bx $(\text{NH}_4)_2\text{SO}_4$ and Na_2HPO_4 were added as yeast food. (Red Star Yeast used as seed throughout).

Batteries

11-22-41

6/6/50
JW

Riboflavin Assay No. 122

Gms. Sample 1.0000

Dilution 1 $\xrightarrow{25\text{ml.}}$ 250 ml. $\xrightarrow{50\text{ml.}}$ 500 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms. / gm. yeast
1	3.0	1.50	29.02	32.39	3.37	3.34	0.061	20.3	19.8
2	3.0	1.50	32.39	35.70	3.31				
3	5.0	2.50	35.70	40.95	5.25	5.20	0.096	19.2	
4	5.0	2.50	40.95	46.10	5.15				
5	7.0	3.50	46.10	6.10	6.10	6.22	0.122	17.5	
6	7.0	3.50	6.10	12.43	6.33				

Comment: 4500 cc NT
500 cc Sour Mash

Hatter

10-22-41

6/6/50
JP

Riboflavin Assay No. 123

Gms. Sample 1.0000

Dilution 1 → 250 ml. → 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. Yeast	Avg. mcgms. / gm. Yeast
1	3.0	1.50	0.01	5.62	5.61	5.82	0.109	36.3	35.4
2	3.0	1.50	5.61	11.64	6.03				
3	5.0	2.50	17.20	24.62	7.42	7.41	0.172	34.4	
4	5.0	2.50	24.62	32.02	7.40				
5	7.0	3.50	32.02	41.54	9.52	9.61	~	~	
6	7.0	3.50	41.54	51.24	9.70				

Comment: 2250 cc NT
 500 cc Sour Mash
 2250 cc Malt + Corn

Hatties

10-24-41

6/6/50
JP

Riboflavin Assay No. 124

Gms. Sample 1.0000

Dilution 1 → 250 ml. → 25 ml. → 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	3.0	1.50	1.00	4.11	3.11	3.10	0.055	18.3	15.8
2	3.0	1.50	4.11	7.20	3.09				
3	5.0	2.50	7.20	11.18	3.98	3.99	0.072	14.4	
4	5.0	2.50	11.18	15.17	3.99				
5	7.0	3.50	15.17	20.66	5.34	5.23	0.098	14.0	
6	7.0	3.50	20.66	25.78	5.12				

Comment: 500 cc Sour Mash
4500 cc Malt & Corn

Hattie

10-12-41

6/6/50
700

Riboflavin Assay No. 125

Gms. Sample 1.0000

Dilution 1 $\xrightarrow{25\text{ ml.}}$ 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	3.0	1.50	25.78	30.09	4.31	4.27	0.078	26.0	(25.4)
2	3.0	1.50	30.09	34.31	4.22				
3	5.0	2.50	34.31	40.49	6.18	6.32	0.124	24.8	
4	5.0	2.50	40.49	46.95	6.46				
5	7.0	3.50	0.00	8.51	8.51	8.46	0.228	32.6	
6	7.0	3.50	8.51	16.91	8.40				

Comment: 5000 cc Malt - Corn

Hatties

11-2-41

Riboflavin Assay No. 126

Gms. Sample 1.0000

Dilution 1 \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

6/6/50
20

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1	3.0	1.50	16.91	23.10	6.19	6.42	0.128	42.6	42.6
2	3.0	1.50	23.10	29.75	6.65				
3	5.0	2.50	29.75	39.73	9.98	10.04	~	~	
4	5.0	2.50	39.73	49.82	10.09				
5	7.0	3.50	0.00	10.01	10.01	10.03	~	~	
6	7.0	3.50	10.01	20.05	10.04				

Comment: Original Red Star Yeast used as seed in all attached fermentations

Check Return

9-30-41

Riboflavin Assay No. 127

Gms. Sample 1.0000

Dilution 1 → 250 ml. 25 ml. 50 ml.

6/6/50

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	3.0	1.50	20.05	21.90	1.85	1.71	0.029	9.7	(9.0)
2	3.0	1.50	21.90	24.11	2.21				
3	5.0	2.50	24.46	26.03	1.57	2.30	0.041	8.2	
4	5.0	2.50	26.03	28.41	2.38				
5	7.0	3.50	28.41	30.92	2.51	2.70	0.049	out 7.0	
6	7.0	3.50	30.92	33.80	2.88				

Comment:

Check

9-30 41

6/4/50

Riboflavin Assay No. 128

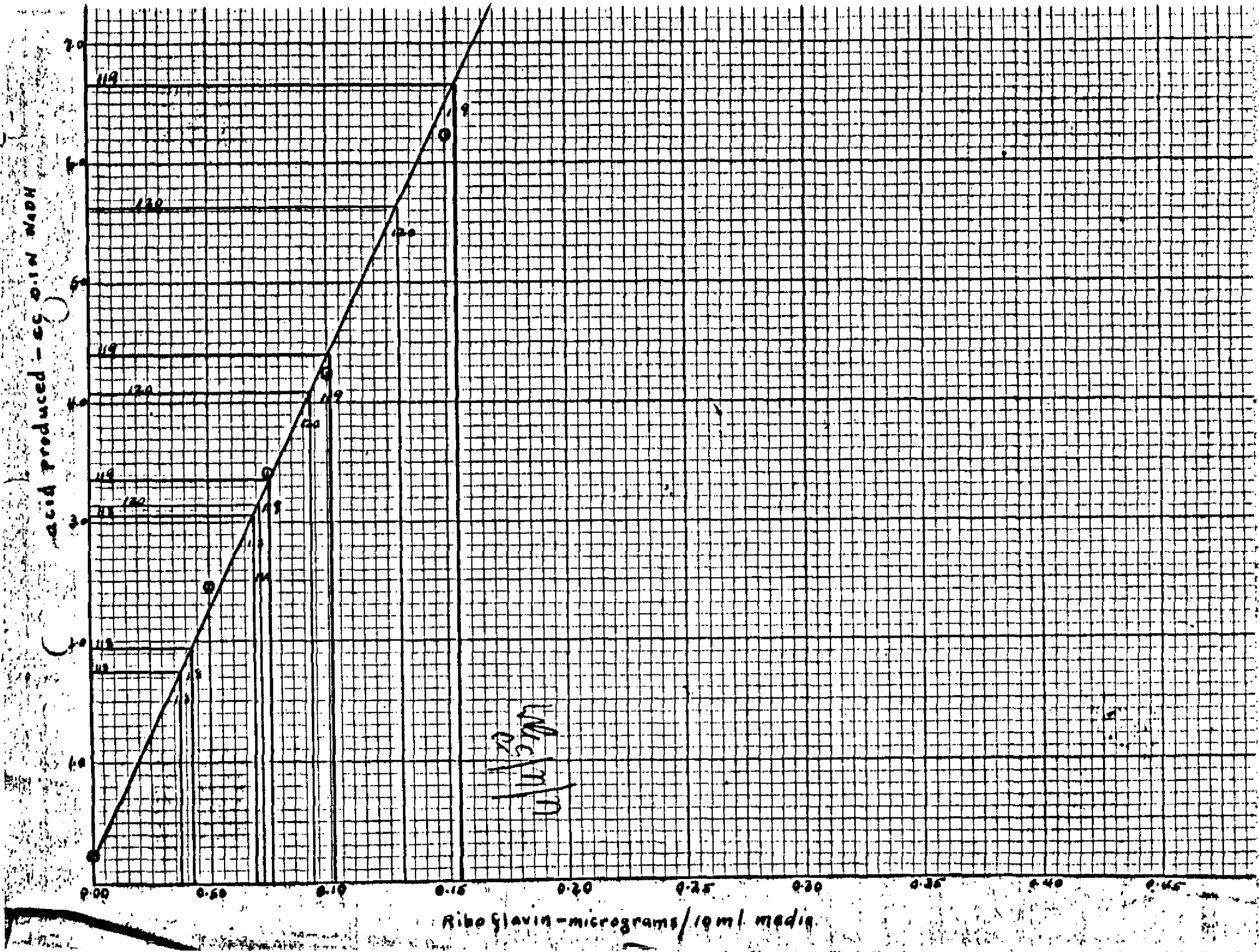
Gms. Sample 1.0000

Dilution 1 → 250 ml. → 25 ml. → 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	3.0	1.50	33.80	37.43	3.63				20.0
2	3.0	1.50	37.70	41.50	3.80	3.72	0.068	22.6	
3	5.0	2.50	41.50	46.39	4.89				
4	5.0	2.50	0.00	5.26	5.26	5.08	0.094	18.8	
5	7.0	3.50	5.26	11.74	6.48				
6	7.0	3.50	11.74	18.17	6.43	6.46	0.129	18.5	

Comment:

Clardse used, see assay #727 for H₂O content



Riboflavin Assays

10-7-41

Assay No.	Sample No.	Date Made	$\frac{\text{Sum. Yocet}}{\text{Avg. Value}}$
118 R	I-7	9-30-41	19.2
119 R	J-1	10-1-41	22.3
120 R	J-2	10-2-41	22.4

UNCL. N10-33-12

70

Refraction (approx)

Standard Curve

Initial Final at 1000 at 1000

0.00	0.23	0.23	0.23
0.38	1.57	1.19	0.23
1.62	4.07	2.45	2.46
4.07	6.53	2.46	
6.53	9.98	3.45	
9.98	13.34	3.36	3.41
13.34	17.27	5.93	
17.27	21.51	4.24	4.24
21.51	27.88	6.37	
27.88	33.94	6.06	6.22
33.94	42.72	7.78	
42.72	51.13	8.41	8.60
51.13	61.69	10.56	10.56
61.69	72.24	10.52	10.52

Initial Final

1000

22.24

23.83

1.62

0.57
1.3

23.83

25.62

1.85

25.62

27.67

2.00

0.043
9.6

27.67

29.59

1.91

29.59

32.60

3.01

0.059
8.6

32.60

35.66

3.06

35.66

39.09

2.44

0.075
15.03

39.09

42.32

2.22

42.32

46.81

4.49

0.101
14.4

0.00

4.90

4.30

4.30

11.00

6.70

0.155
19.4665

11.00

17.50

6.60

17.50

20.76

3.16

0.032
14.03

20.76

23.83

3.07

23.83

28.13

4.30

0.093
10.7

28.13

31.99

3.86

0.093
10.7

31.99

37.70

5.77

0.110
16.3

37.70

43.21

5.51

0.110
16.3

Pantothine acid (I1, J1, J2)

Standard Curve

Initial	Final	mil min	sec
43.21	44.31	1.10	1.03
44.31	45.27	0.96	
45.27	48.34	3.07	2.82
0.00	2.56	2.56	
2.56	8.23	5.67	5.57
8.23	13.70	5.47	
13.70	21.11	7.41	7.41
21.11	28.52	7.41	
28.52	37.58	9.06	9.10
37.58	46.71	9.13	
0.13	10.80	10.67	
10.80	21.21	10.41	10.54
21.21	31.92	10.71	
31.92	42.55	10.57	10.64

Auto. step

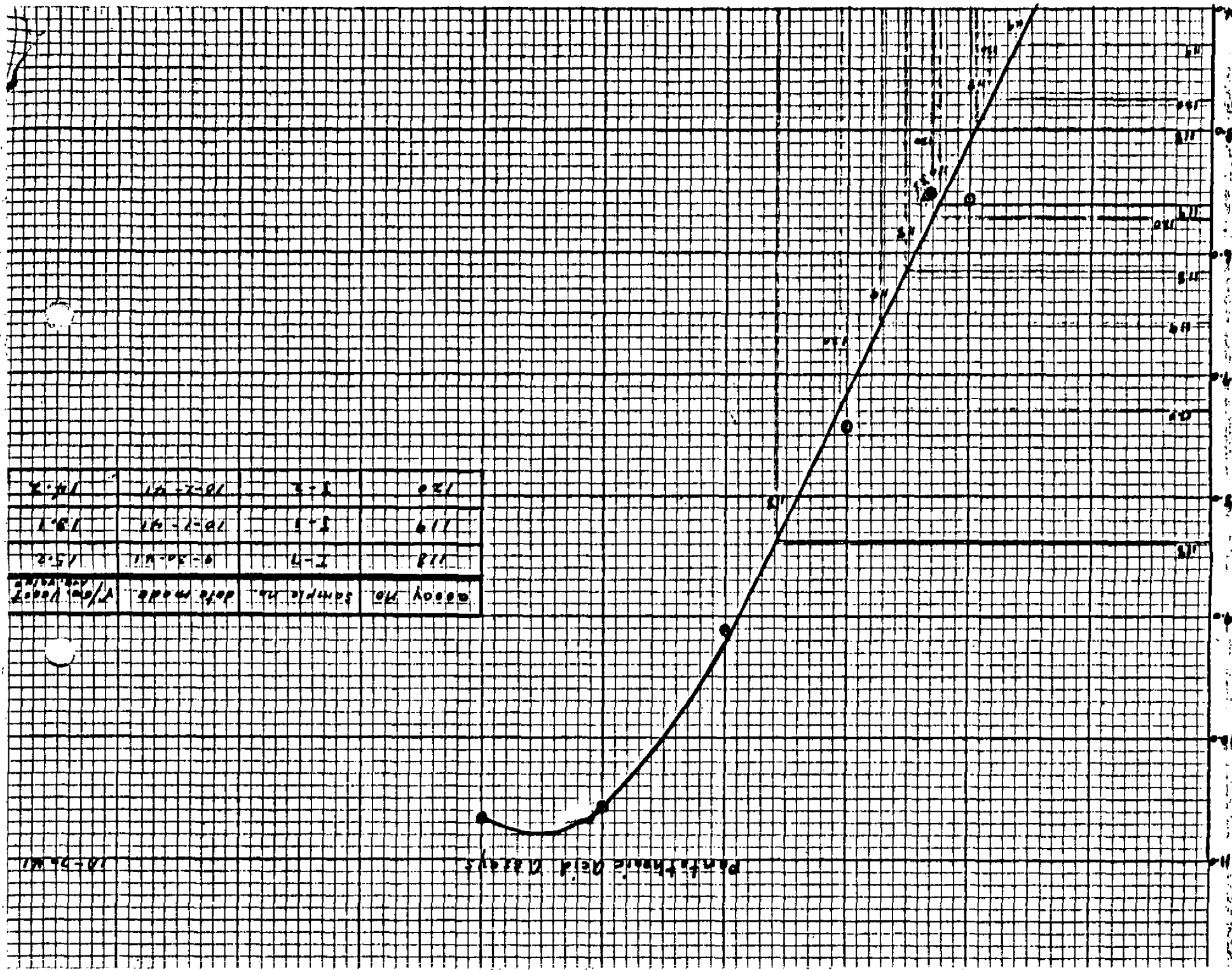
Initial Final Ave

42.55	47.45	4.90	4.98
0.00	5.05	5.05	0.049 16.5
5.05	11.14	6.09	6.13
11.14	17.30	6.16	0.063 14.0
17.30	25.66	8.36	0.084 19.5
25.66	33.52	7.86	3.6

33.52	37.87	4.35	4.29
37.87	42.10	4.23	0.041 75.7
42.10	47.60	5.50	0.056 12.5
0.00	5.69	5.69	6.0
5.69	12.27	6.52	0.07 8.2
12.27	18.83	6.62	5.7

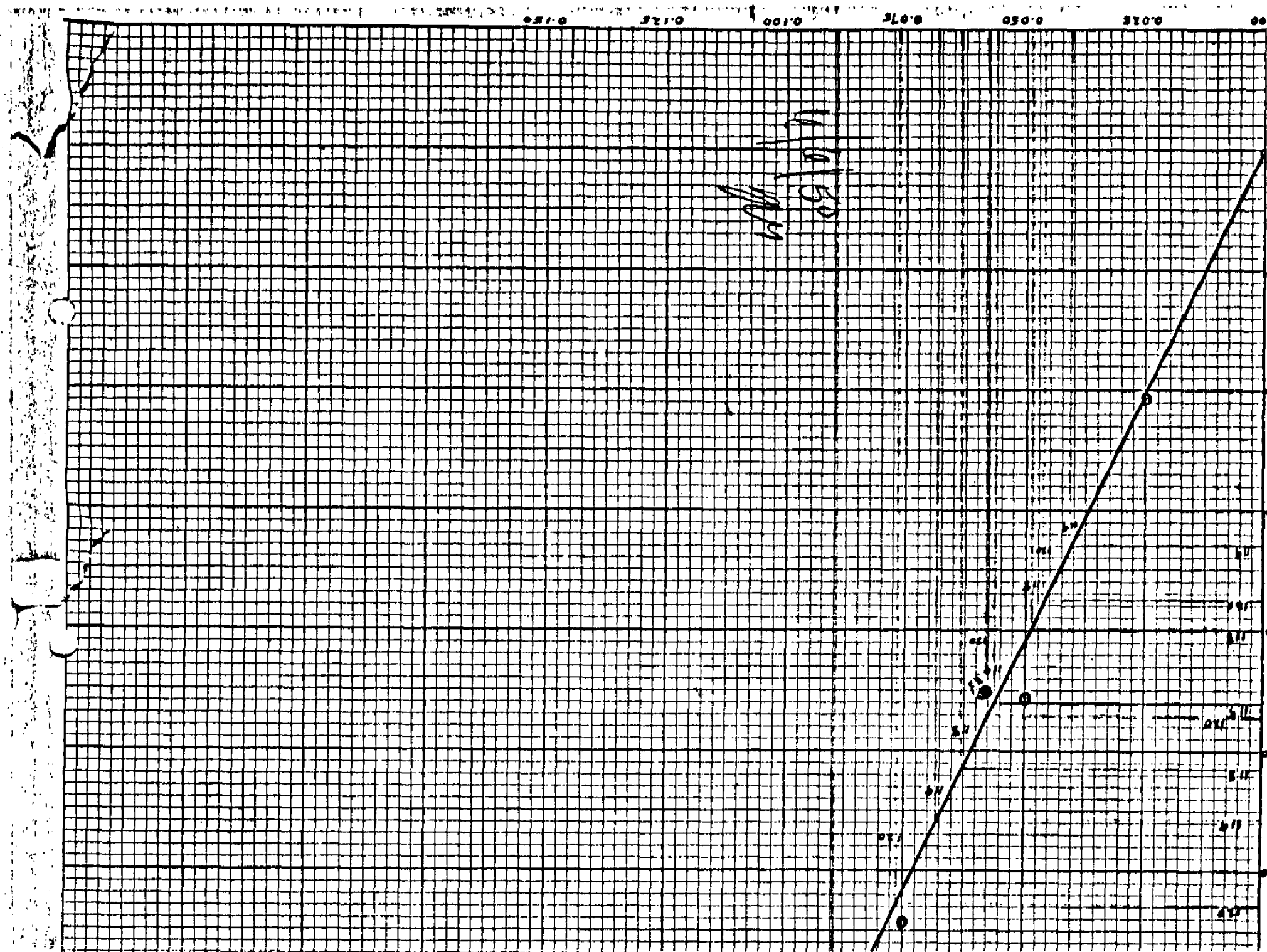
18.83	23.63	4.80	4.76
23.63	28.35	4.72	0.043 15.7
28.35	34.14	5.72	5.72
34.14	39.86	5.72	0.067 14.7
39.86	47.07	7.15	7.20
0.00	7.36	7.36	0.076 9.5

0.1N. alkali



Pentathionic acid assays

10-25-41



100

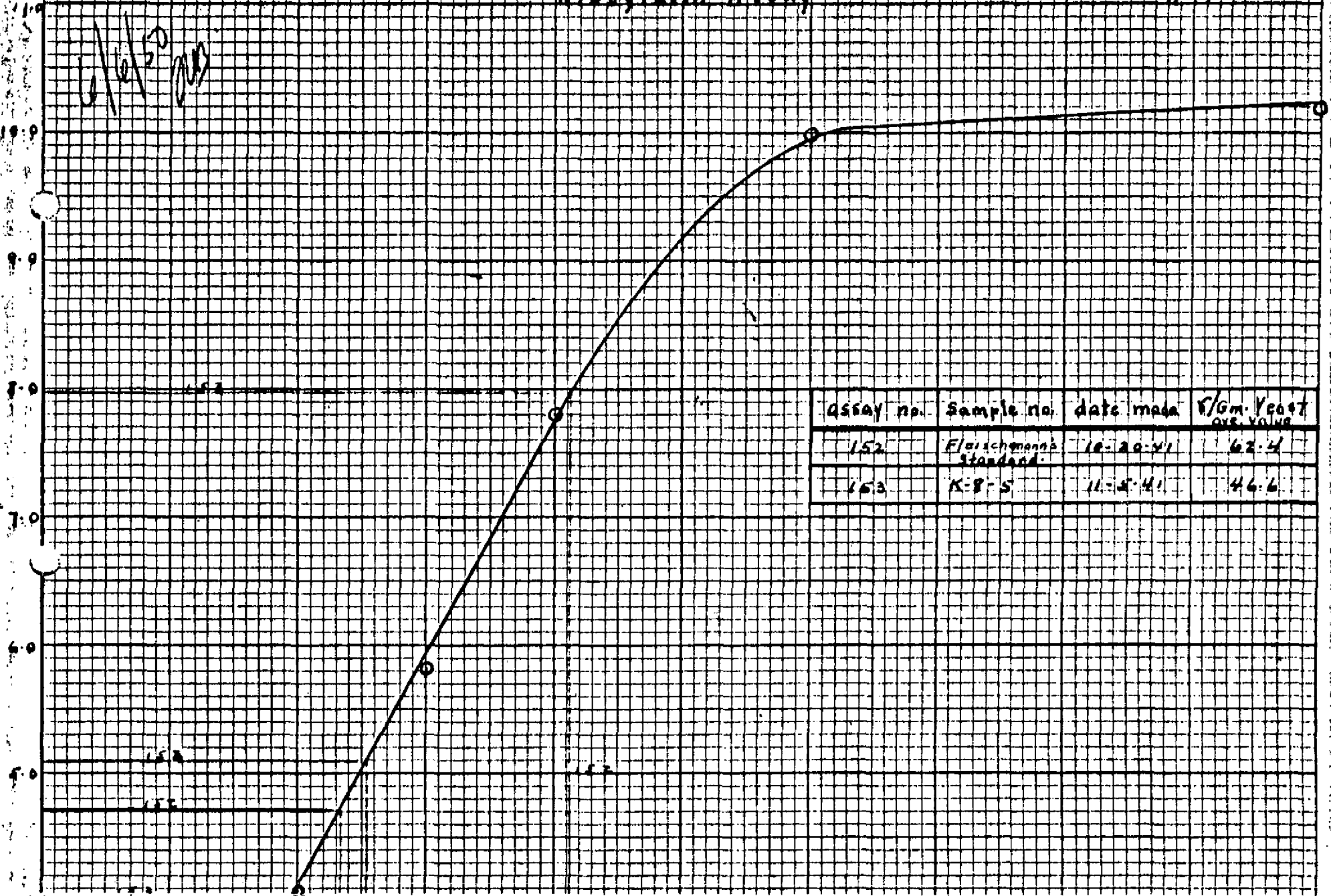


Riboflavin, micrograms / ml. med. g.

Alkagloxin Assay

11-17-41

6/6/50



Assay no.	Sample no.	date made	g/Gm. Yeast avg. value
152	Fleischmann's Standard	10-20-41	62.4
153	K-8-S	11-4-41	46.6

6/6/50
20

Standard Curve Data for Riboflavin

Assays Nos. 152 and 153

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.00	0.43	0.43	
2	0.00	0.00	0.43	0.99	0.56	0.50
3	0.05	0.50	0.99	8.66	2.67	
4	0.05	0.50	3.66	6.13	2.47	2.47
5	0.075	0.75	6.13	9.33	3.30	
6	0.075	0.75	9.33	12.67	3.34	3.32
7	0.10	1.00	12.67	16.70	4.03	
8	0.10	1.00	16.70	20.81	4.11	4.07
9	0.15	1.50	20.81	27.06	6.25	
10	0.15	1.50	27.06	32.43	5.37	5.81
11	0.20	2.00	32.43	40.36	7.93	
12	0.20	2.00	40.36	48.03	7.67	7.80
13	0.30	3.00	0.00	9.99	9.99	
14	0.50	5.00	9.99	20.16	10.17	10.17

date rec'd 10/20/51

10/6/50
JPM

Riboflavin Assay No. 152

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{2 \text{ cm.}}$

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.00	1.00	43.34	46.10	2.76				62.4
2	1.00	1.00	46.10	49.19	3.09	2.93	0.066	66.0	
3	2.00	2.00	0.00	4.71	4.71				
4	2.00	2.00	4.96	9.68	4.72	4.72	0.117	58.6	
5	3.00	3.00	9.78	15.69	5.91				
6	3.00	3.00	15.69	23.66	7.97	7.97	0.206	68.7	

Comment: Assay set from sample received from Dr. Frey - Fleischmann Labs. - Sample marked type 680 - lot #528
 Assay given by Dr. Frey was - Ribo 708/gm. - Pantothenic Acid - 1505/6

11/5/41

6/6/50
JMS

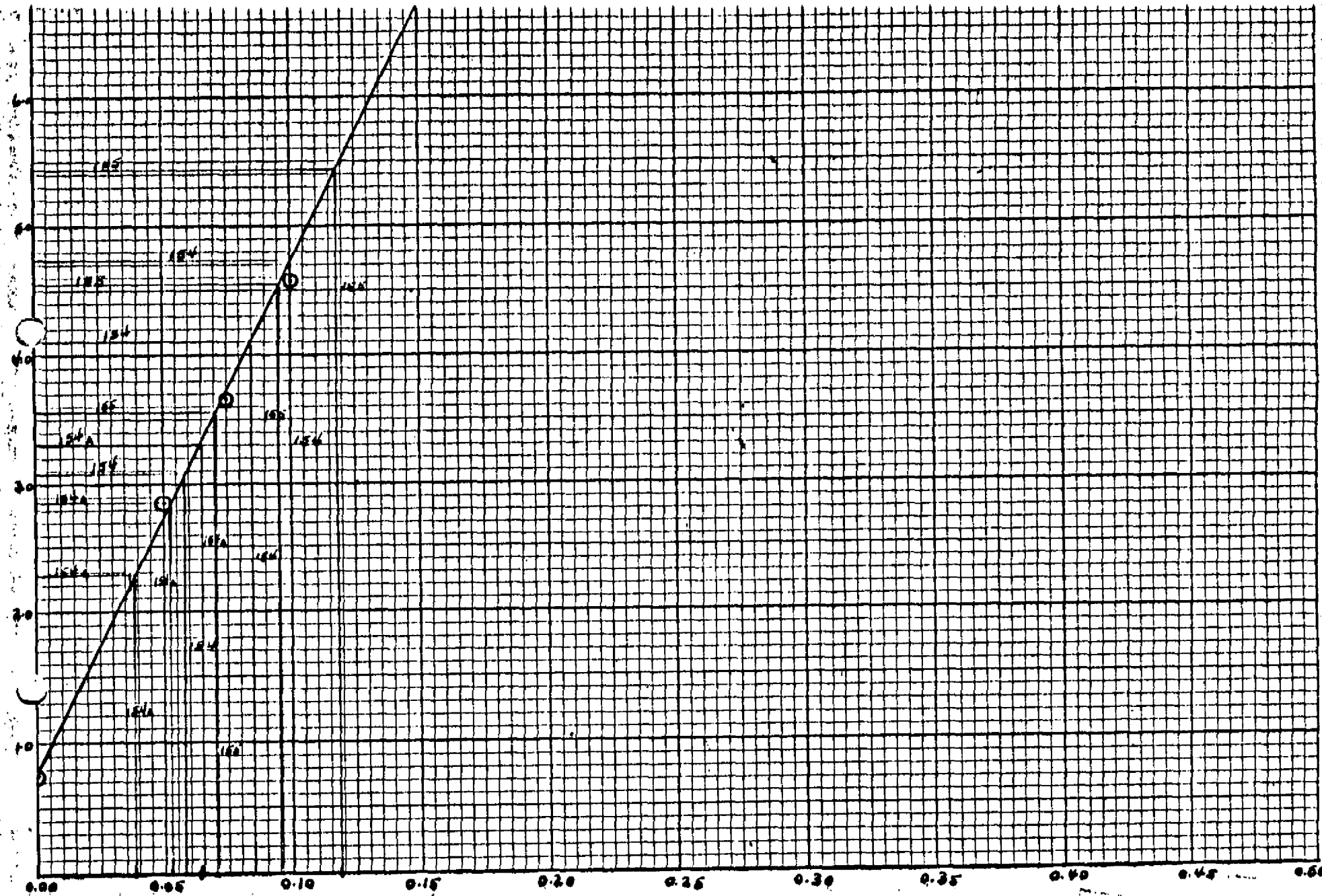
Riboflavin Assay No. 153

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. \longrightarrow 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	1.00	1.00	20.16	22.47	2.31	2.47	0.055	55.0	416.6
2	1.00	1.00	22.47	25.11	2.64				
3	2.00	2.00	25.11	29.13	4.02	4.03	0.097	48.5	
4	2.00	2.00	29.13	33.16	4.03				
5	3.00	3.00	33.16	38.15	4.99	5.09	0.127	42.4	
6	3.00	3.00	38.15	43.34	5.19				

Comment: Sample submitted by Mr. Peterson - regular yeast produce in plant 11/5/41 - Sample # K-8-5 - and fortified with 3 times amount of vitamins.

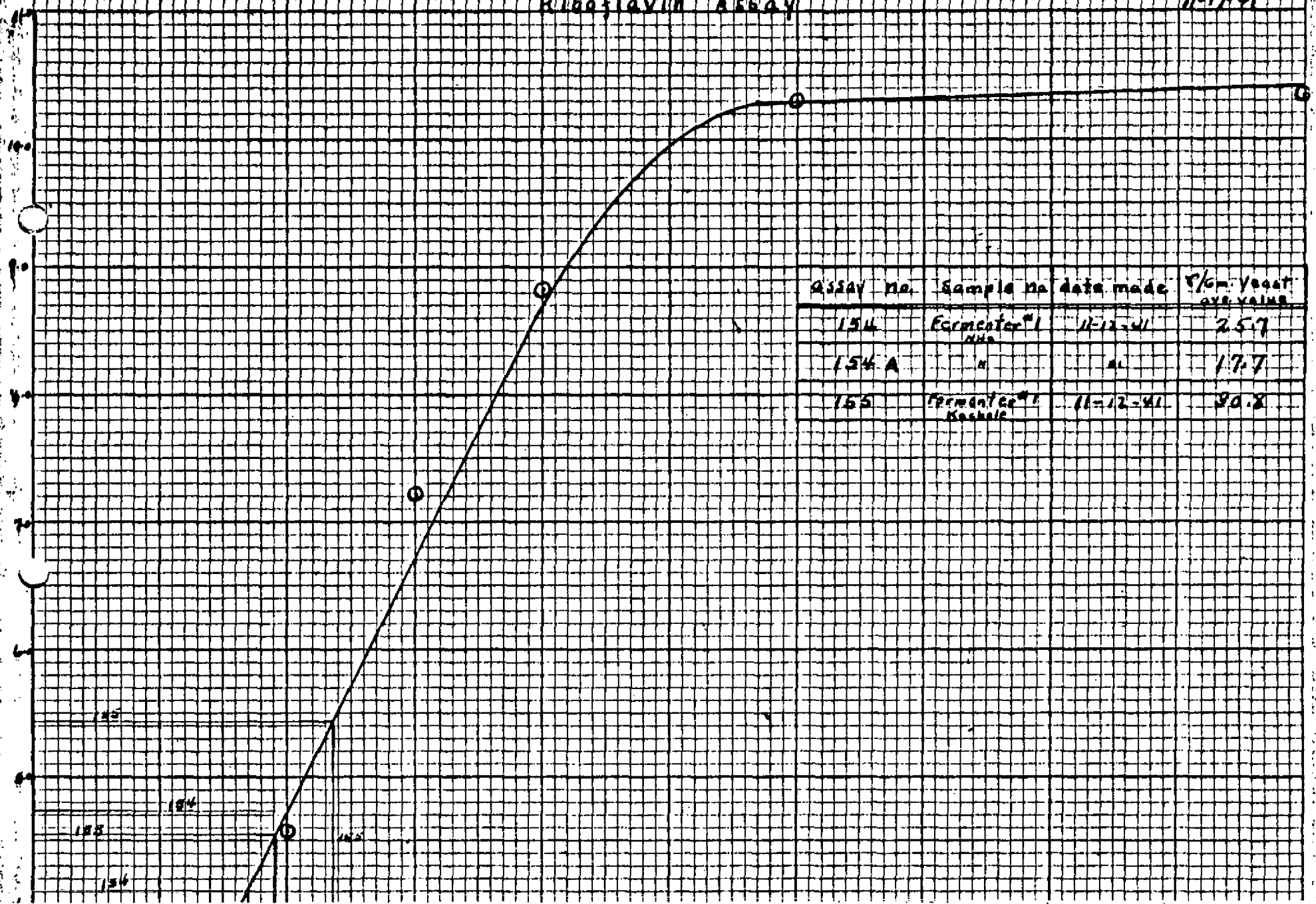


Riboflavin - micrograms / 10 ml. media

6/6/50
20

Riboflavin Assay

11-17-41



4/6/50
20

Standard Curve Data for Riboflavin

Assays Nos. 154, 154-A and 155

10 → 100
4
15 → 100
10 → 100
25 → 50
10 → 100

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.02	0.72	0.70	
2	0.00	0.00	0.72	1.54	0.82	0.76
3	0.05	2.00	1.54	4.42	2.88	
4	0.05	2.00	4.52	7.45	2.83	2.86
5	0.075	3.00	7.55	11.16	3.61	
6	0.075	3.00	11.16	14.80	3.64	3.63
7	0.10	4.00	14.80	19.33	4.53	
8	0.10	4.00	19.33	23.90	4.57	4.55
9	0.15	3.00	23.90	31.12	7.22	
10	0.15	3.00	31.12	38.33	7.21	7.21
11	0.20	4.00	38.33	47.49	9.16	
12	0.20	4.00	0.00	8.82	8.82	8.99
13	0.50	3.00	8.82	19.13	10.31	10.31
14	0.50	5.00	19.53	29.86	10.33	10.33

6/6/50
20

Riboflavin Assay No. 154
Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	2.00	2.00	29.86	33.05	3.19				25.7
2	2.00	2.00	33.05	36.01	2.96	3.08	0.058	29.0	
3	3.00	3.00	36.01	40.11	4.10				
4	3.00	3.00	40.11	44.20	4.09	4.10	0.085	28.3	
5	4.00	4.00	44.20	48.89	4.69				
6	4.00	4.00	0.00	41.75	4.75	4.72	0.100	25.0	

Comment: Sample of Yeast from Fermenter #1 - Experimental run in which liquid ammonia was used in an attempt to hold pH of 5.0 during fermentation.
pH of sample submitted for assay was 3.6

6/6/50
20

Riboflavin Assay No. 154-A

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mcgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	2.00	2.00	4.75	6.98	2.23				
2	2.00	2.00	6.98	9.33	2.35	2.29	0.038	19.0	
3	3.00	3.00	9.33	12.31	2.88				
4	3.00	3.00	12.31	15.00	2.79	2.84	0.053	17.7	
5	4.00	4.00	15.00	18.31	3.31				
6	4.00	4.00	18.31	21.60	3.29	2.30	0.065	16.3	

Comment: Duplicate of Assay No. 154-

6/6/50
JP

Riboflavin Assay No. 155

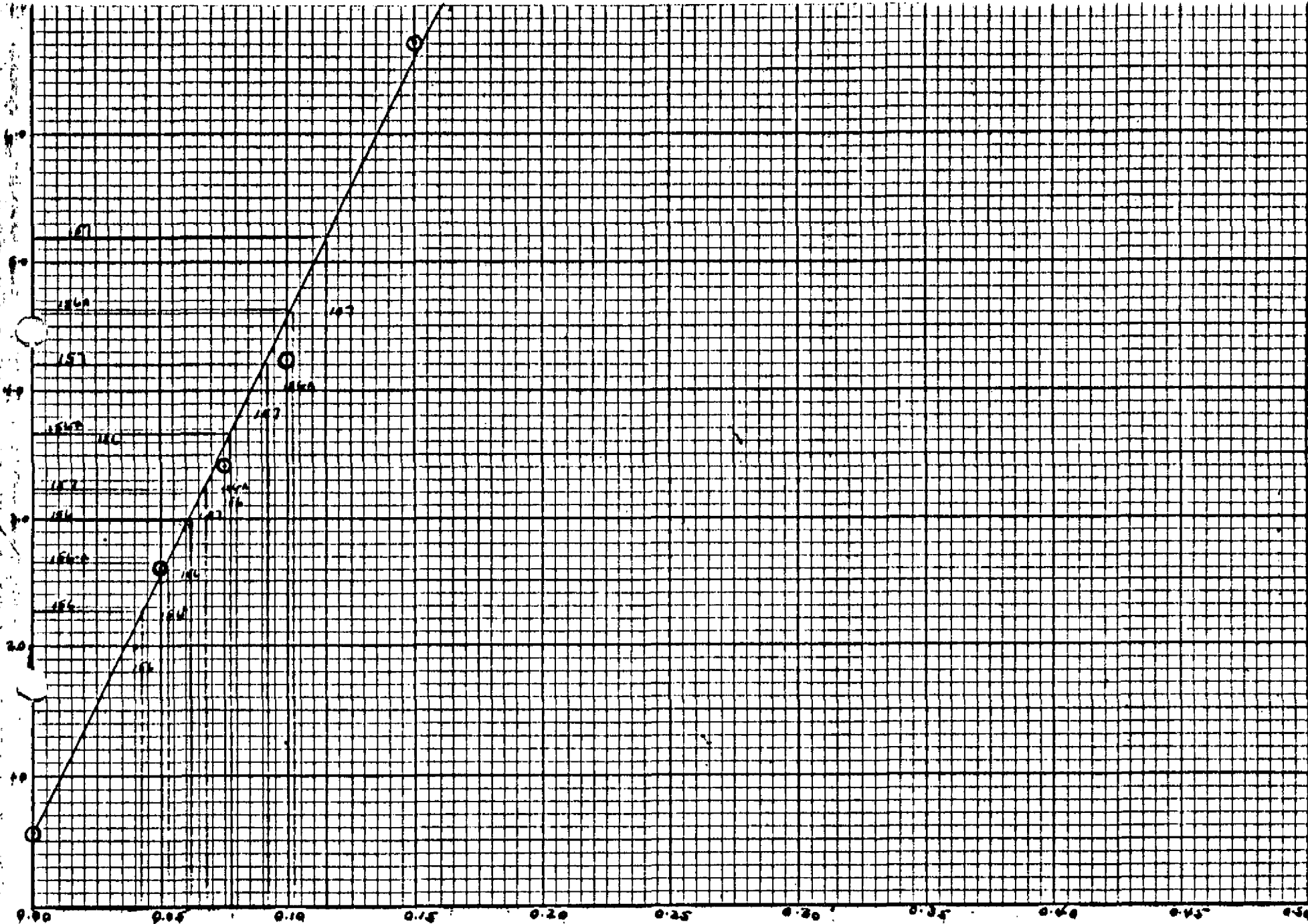
Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{25 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	2.00	2.00	21.60	25.13	3.53				
2	2.00	2.00	25.13	28.72	3.59	3.56	0.071	35.5	
3	3.00	3.00	28.72	33.26	4.54				
4	3.00	3.00	—	—	—	4.54	0.096	32.0	
5	4.00	4.00	33.26	38.68	5.42				
6	4.00	4.00	38.68	44.09	5.41	5.42	0.119	29.8	

Comment: Sample of yeast produced in Fermenter No. 1. - Yeast assayed was taken by H. Pachle and centrifuged and dried in the Laboratory under vacuum.

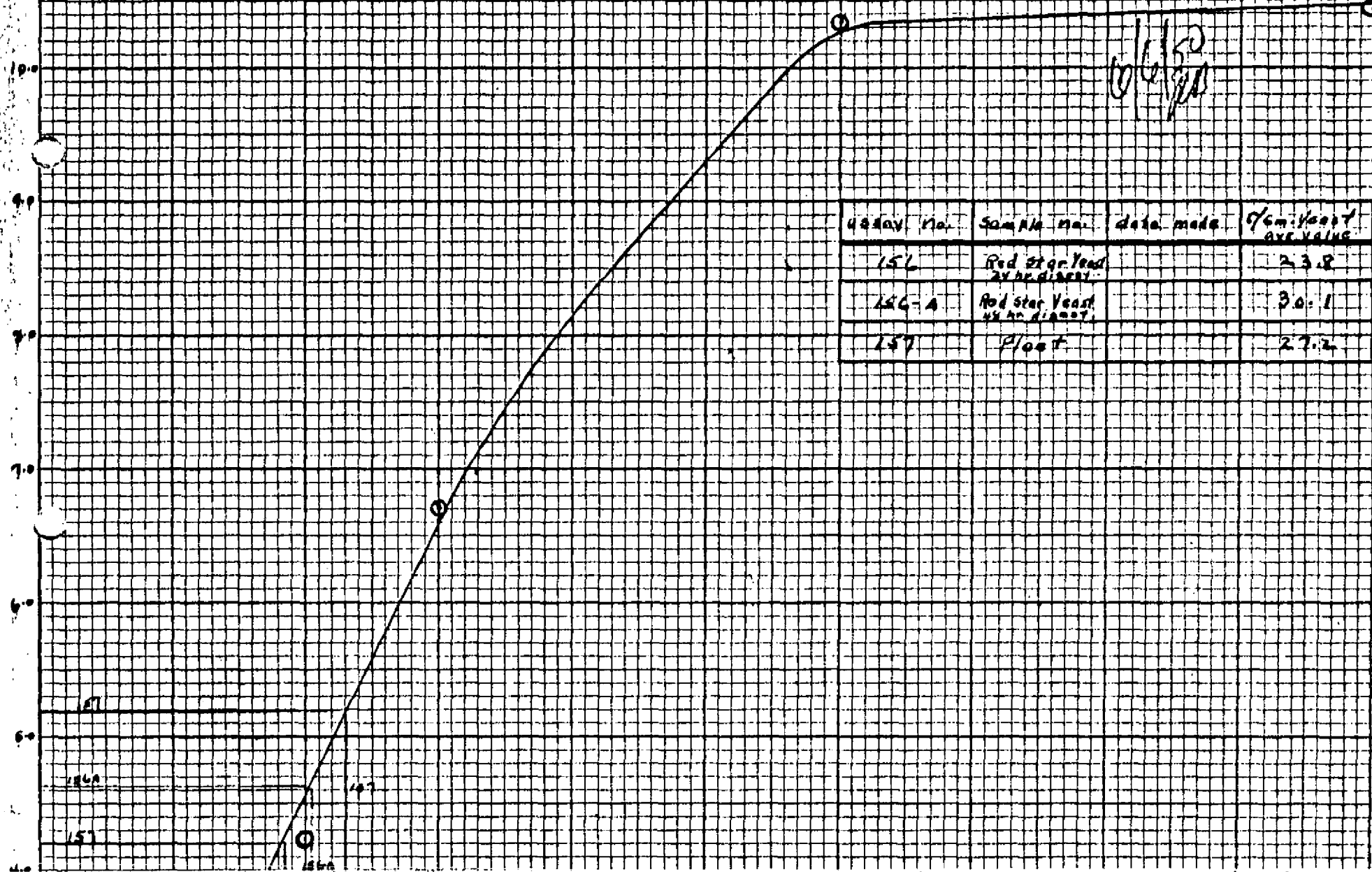
pH of yeast submitted by Mr. Pachle was 4.4.



Riboflavin - micrograms/10ml media

Riboflavin Assays

11-24-41



Assay No.	Sample No.	data made	%m. Yeast Ave. Value
156	Red Star Yeast 24 hr. digest		23.8
156-A	Red Star Yeast 48 hr. digest		30.1
157	Plant		27.2

156/157

6/6/50
20

Standard Curve Data for Riboflavin

Assays Nos. 156, 156-A and 157

10 → 100
and
25 → 100

10 → 100
and
25 → 50

10 → 100

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.00	0.64	0.64	
2	0.00	0.00	0.64	1.12	0.48	0.56
3	0.05	2.00	1.12	3.73	2.61	
4	0.05	2.00	3.73	6.33	2.60	2.61
5	0.075	3.00	6.33	9.87	3.54	
6	0.075	3.00	9.87	13.16	3.29	3.42
7	0.10	4.00	13.16	17.46	4.30	
8	0.10	4.00	17.46	21.60	4.14	4.22
9	0.15	3.00	21.60	28.32	6.72	
10	0.15	3.00	28.32	34.24	5.82	6.72
11	0.20	4.00	34.24	43.63	9.39	
12	0.20	4.00	0.00	9.42	9.42	9.41
13	0.30	3.00	9.42	19.75	10.33	10.33
14	0.50	5.00	19.75	30.17	10.42	10.42

6/6/60
JAB

Riboflavin Assay No. 156

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.50	1.50	30.17	32.45	2.28				23.8
2	1.50	1.50	32.45	34.72	2.27	2.28	0.043	28.7	
3	2.50	2.50	34.72	37.77	3.05				
4	2.50	2.50	37.77	40.72	2.95	3.00	0.062	24.8	
5	3.50	3.50	40.72	44.32	3.60			04+	
6	3.50	3.50	44.32	48.04	3.72	3.66	0.077	22.0	

Comment: Sample submitted was a composite of yeast produced in the plant since the distillery started using Red Star yeast.

Digestion was carried out with 24 hour Clarase (2gm.) digest to make sure that 48 hours was necessary for digestion as called for by Dr. At.

Riboflavin Assay No. 156-A

Gms. Sample 1.0000

Dilution 1 am. → 250 ml. → 25 ml. → 100 ml.

6/6/50
JMS

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1	1.50	1.50	0.00	2.66	2.66	2.66	0.053	35.3	30.1
2	1.50	1.50	2.66	5.32	2.66				
3	2.50	2.50	5.32	9.14	3.82	3.67	0.077	30.8	
4	2.50	2.50	9.14	12.66	3.52				
5	3.50	3.50	12.66	17.19	4.53	4.61	0.103	29.5	
6	3.50	3.54	17.19	21.88	4.69				

Comment: Sample submitted was a composite of yeast produced in the plant since the distillery started using Red Star yeast.
Digestion was carried out with 48 hour charcoal (2 gm) digestion.

6/6/50
20

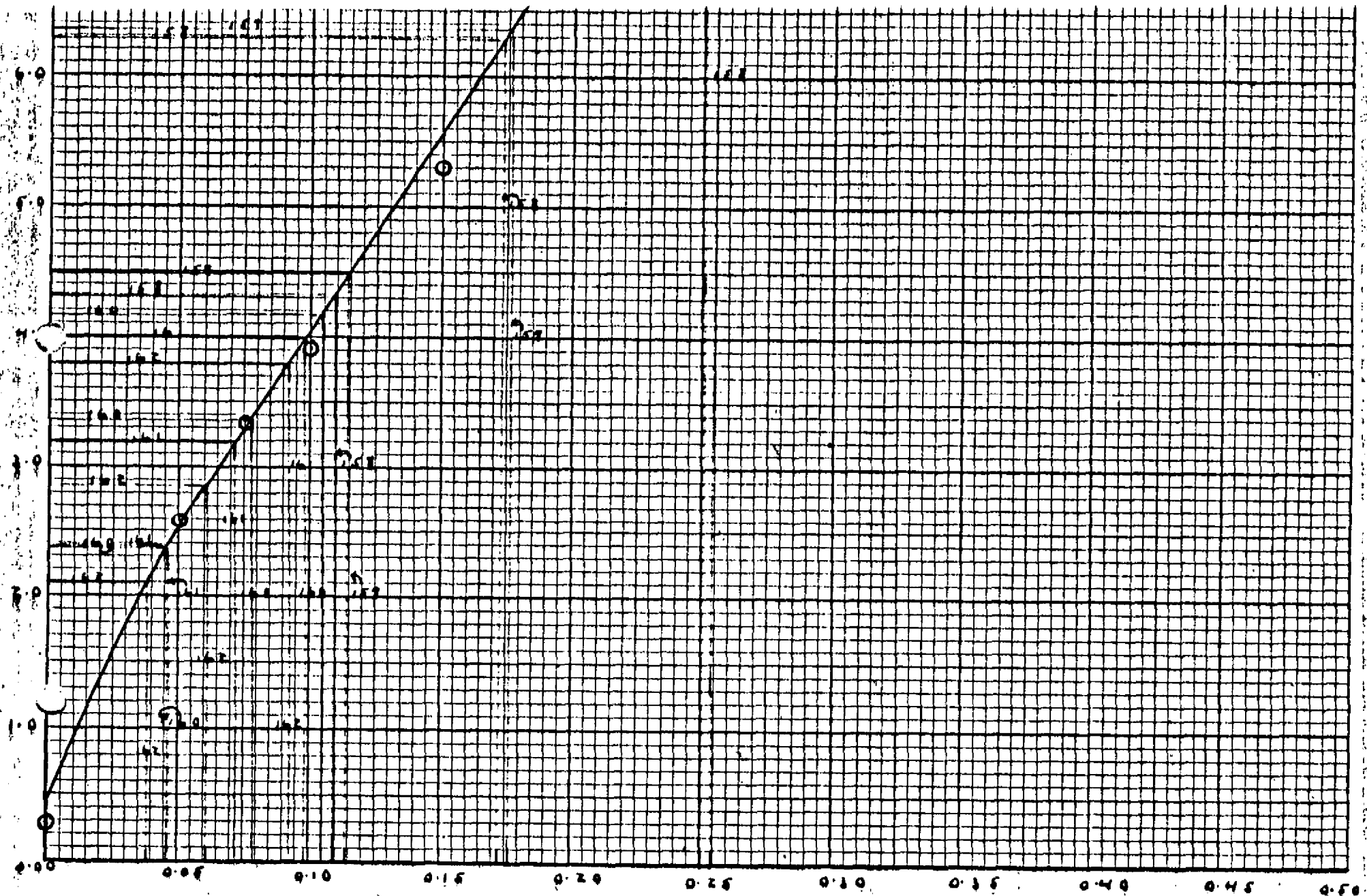
Rib. flavin Assay No. 157

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. \longrightarrow 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Rib. flavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1	2.00	2.00	21.88	25.02	3.14	3.23	0.068	34.0	27.2
2	2.00	2.00	25.02	28.33	3.31				
3	3.00	3.00	28.33	32.47	4.14	4.20	0.092	30.6	
4	3.00	3.00	32.47	36.72	4.25				
5	4.00	4.00	36.72	41.86	5.14	5.19	0.116	28.8	
6	4.00	4.00	41.86	47.10	5.24				

Comment: Sample submitted by Mr. Peterson from your
 produced sometime ago _____ and assayed
 by outside laboratory.

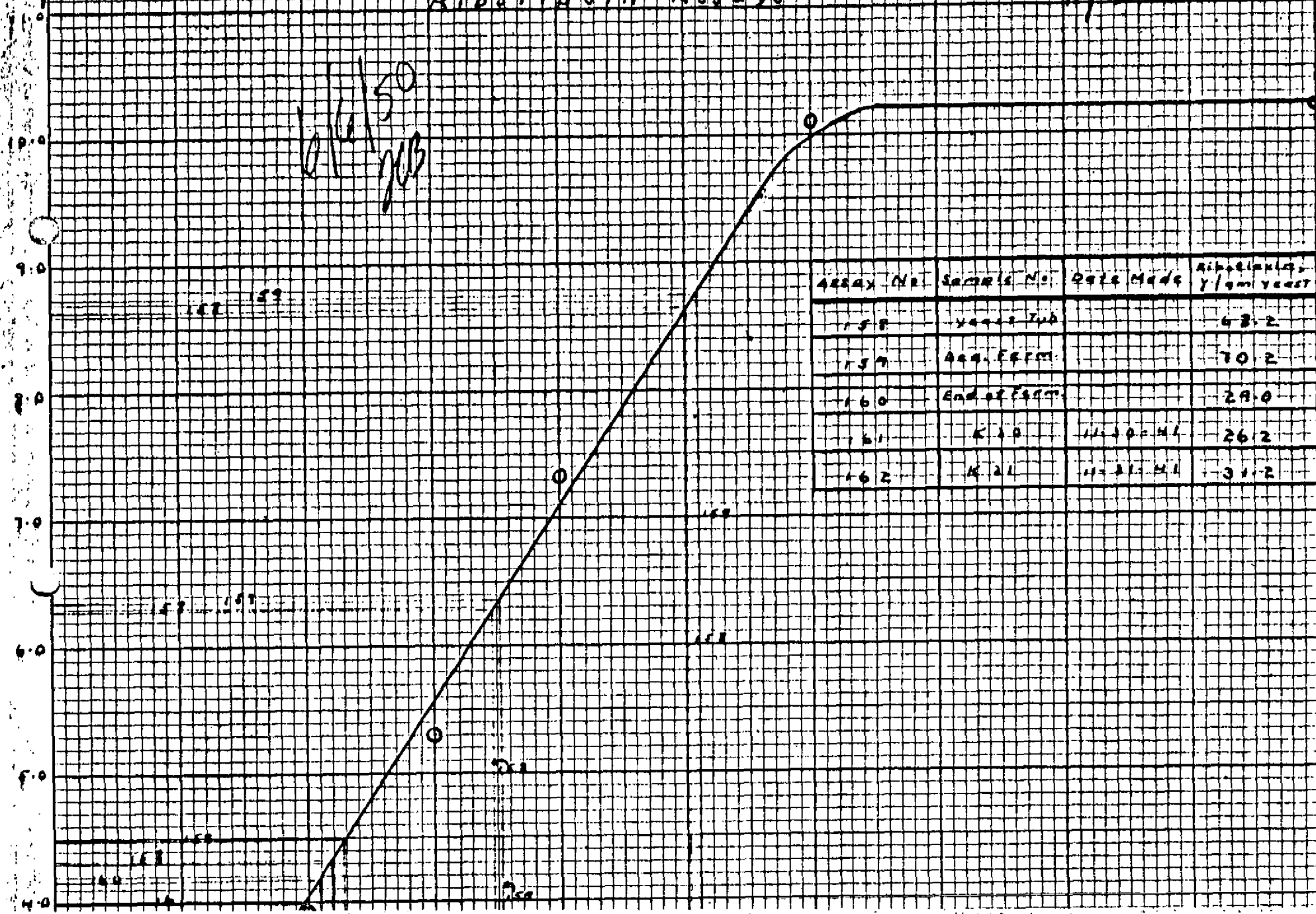


Riboflavin, micrograms / 10 ml. media.

Riboflavin Assays

11/25

6/6/50
JCS



Assay No.	Sample No.	Date Made	Riboflavin, γ /gm yeast
158	Yeast 7th		48.2
159	449. ESEM		70.2
160	End of 449m		29.0
161	K 10	11-30-51	26.2
162	K 21	11-31-51	31.2

Standard Curve Data for Riboflavin

Assays Nos. 158, 159, 160, 161, and 162

6/6/50
JAB

Tube No.	Synthetic Riboflavin.		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.19	0.44	0.25	
2	0.00	0.00	0.44	0.72	0.28	0.27
3	0.05	1.00	0.72	3.37	2.65	
4	0.05	1.00	3.37	5.90	2.53	2.59
5	0.175	1.50	5.90	9.28	3.38	
6	0.175	1.50	9.28	12.58	3.30	3.34
7	0.10	2.00	12.58	16.43	3.85	
8	0.10	2.00	16.53	20.52	3.99	3.92
9	0.15	3.00	20.52	25.83	5.31	
10	0.15	3.00	25.83	31.12	5.29	5.30
11	0.20	4.00	31.12	38.74	7.62	
12	0.20	4.00	38.74	45.73	6.99	7.32
13	0.50	5.00	0.30	10.37	10.07	10.07
14	0.50	5.00	10.37	20.55	10.18	10.18

16 → 1000

10 → 100

16 → 1000

20 → 100

Riboflavin Assay No. 158

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

4/6/50
JAS

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.50	1.50	20.52	25.00	4.48				68.2
2	1.50	1.50	25.00	29.15	4.15	4.32	0.109	72.7	
3	2.50	2.50	29.35	35.90	6.55				
4	2.50	2.50	36.05	42.05	6.00	6.28	0.173	69.2	
5	3.50	3.50	42.05	50.90	8.85				
6	3.50	3.50	0.90	9.32	8.42	8.64	0.251	71.6	

YT
Comment:

Riboflavin Assay No. 159

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml}}$ 100 ml.

6/6/50

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.50	1.50	9.32	13.75	4.43				70.2
2	1.50	1.50	13.75	18.25	4.50	4.48	0.114	75.9	
3	2.50	2.50	18.25	24.80	6.55				
4	2.50	2.50	24.80	30.95	6.15	6.35	0.177	70.8	
5	3.50	3.50	30.95	39.62	8.67				
6	3.50	3.50	39.72	48.53	8.81	8.74	0.255	72.9	

BF

Comment:

Riboflavin

Assay No. 160

Gms. Sample 0.960

Dilution 0.960 Gm

→ 250 → 25ml → 100 ml.

6/6/50
JLB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.44	1.50	0.00	2.35	2.35				29.0
2	1.44	1.50	2.35	5.72	2.37	2.36	0.046	32.0	
3	3.40	2.50	5.72	9.07	3.35	3.35			
4	2.40	2.50	9.07	19.65	out-(contamination).		0.078	32.7	
5	3.36	3.50	19.65	23.80	4.15				
6	3.36	3.50	23.80	27.97	4.17	4.16	0.105	31.3	

Comment:

4/6/50
JH

Riboflavin Assay No. 161

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.50	1.50	27.30	29.75	2.35				26.2
2	1.50	1.50	29.75	32.15	2.40	2.38	0.046	30.7	
3	2.50	2.50	32.15	35.40	3.25				
4	2.50	2.50	35.40	38.50	3.10	3.18	0.0725	29.0	
5	3.50	3.50	38.70	42.75	4.05				
6	3.50	3.50	42.75	46.65	3.90	3.98	0.098	27.0	

K-20
Comment:

Riboflavin Assay No. 162

Qns. Sample 1.0000

Dilution 1 gm. \longrightarrow 25 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

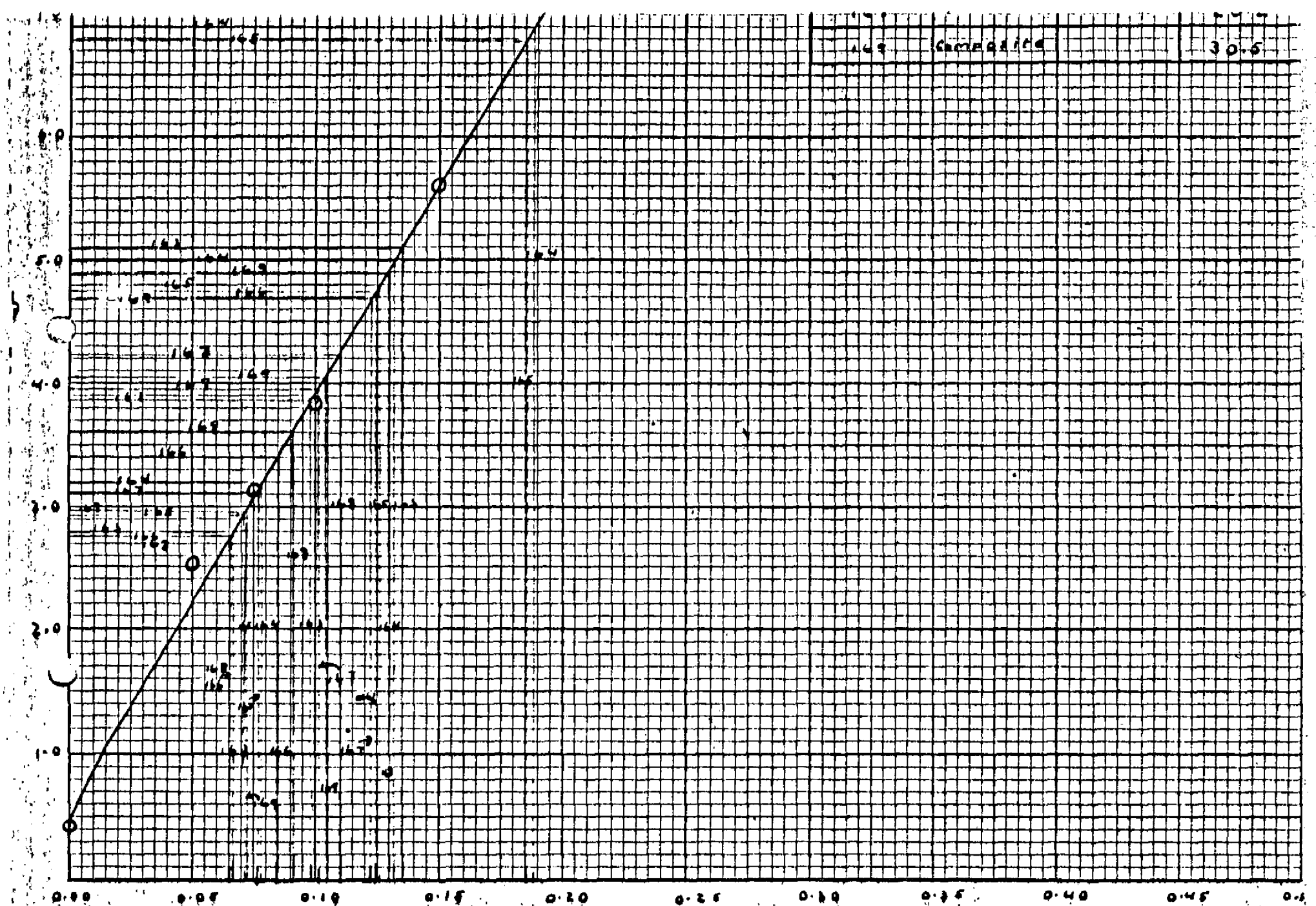
6/6/50
20

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	1.00	1.00 ✓	0.00	2.30	2.30	2.10	0.038	38.0	31.2
2	1.00	1.00	2.40	4.30	1.90				
3	2.00	2.00	4.30	7.15	2.85	2.85	0.061	30.5	
4	2.00	2.00	7.15	10.00	2.85 <small>1 1/2 drops</small>				
5	3.00	3.00	10.00	13.80	3.80	3.78	0.093	31.0	
6	3.00	3.00	13.80	17.55	3.75				

CK-51

Comment;

0.09

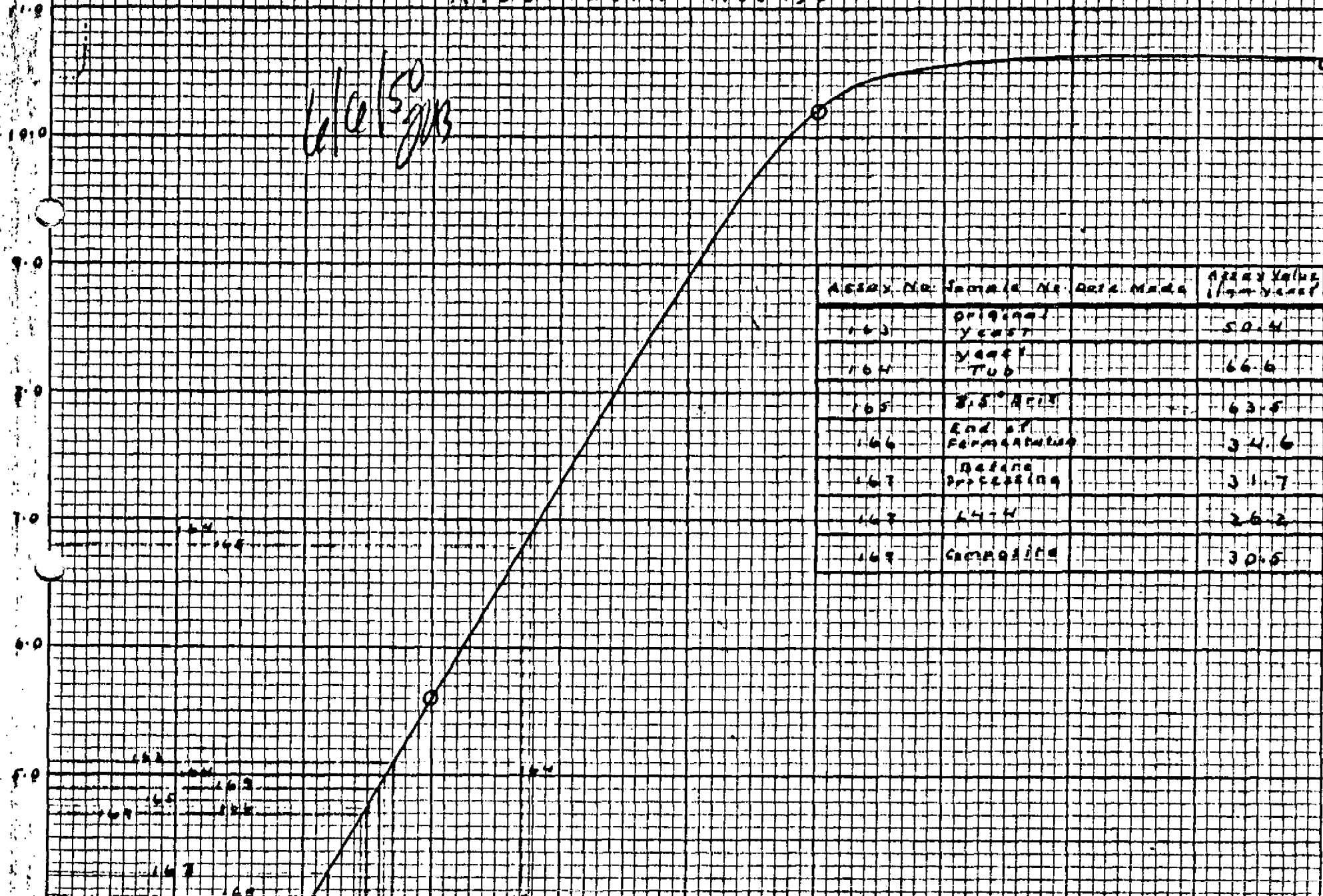


Riboflavin, micrograms / 10 ml media

Riboflavin Assays

12-12-51

W/O 150 gms



6/6/50
10

Standard Curve Data for Riboflavin

Assays Nos. 163, 164, 165, 166, 167, 168 and 169.

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.03	0.50	0.47	
2	0.00	0.00	0.50	0.87	0.37	0.42
3	0.05	0.50	0.87	3.36	2.49	
4	0.05	0.50	3.36	5.92	2.56	2.53
5	0.075	0.75	5.92	9.04	3.12	
6	0.075	0.75	9.04	12.20	3.16	3.14
7	0.100	1.00	12.20	16.09	3.89	
8	0.100	1.00	16.09	19.92	3.81	3.85
9	0.15	1.50	19.92	25.29	5.37	
10	0.15	1.50	25.29	31.12	5.83	5.60
11	0.20	2.00	31.12	39.47	8.35	
12	0.20	2.00	39.47	47.63	8.16	8.26
13	0.30	3.00	0.10	10.30	10.20	10.20
14	0.50	5.00	10.30	20.88	10.58	10.58

Riboflavin Assay No. 163

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

4/6/50
JPD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	1.00	1.00	10.88	23.43	2.55	2.79	0.066	66.0	50.4
2	1.00	1.00	23.43	26.45	3.02				
3	2.00	2.00	26.45	30.36	4.91	3.86	0.098	49.0	
4	2.00	2.00	30.36	34.17	3.81				
5	3.00	3.00	34.17	39.17	5.00	5.08	0.136	45.3	
6	3.00	3.00	39.17	44.32	5.15				

Comment:

Sample assayed was original 1# cake used to seed the tub.

Riboflavin Assay No. 164

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

6/6/50
JH

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. gm. yeast
1	1.00	1.00	44.32	47.66	3.27	3.19	0.077	77.0	66.6
2	1.00	1.00	0.00	3.10	3.10				
3	2.00	2.00	3.10	7.07	3.97	4.99	0.132	66.0	
4	2.00	2.00	8.07	13.07	5.00				
5	3.00	3.00	13.07	20.05	6.97	6.89	0.187	62.7	
6	3.00	3.00	20.05	26.84	6.79				

Comment: Sample was taken directly from Yeast tub.

Blanket

Riboflavin Assay No. 165

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

6/6/50
JMD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms./ gm. yeast
1	1.00	1.00	26.84	29.71	2.87	2.94	0.071	71.0	63.5
2	1.00	1.00	29.76	32.77	3.01				
3	2.00	2.00	32.77	37.51	4.74	4.79	0.127	63.5	
4	2.00	2.00	37.51	42.35	4.84				
5	3.00	3.00	42.35	49.03	6.68	6.78	0.186	61.9	
6	3.00	3.00	0.00	6.87	6.87				

Comments:

Sample was taken from #1 fermenter when the brix had dropped to 8.5 -

1/6/5
ms

Riboflavin Assay No. 166

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	1.50	1.50	6.87	9.55	2.68	2.77	0.065	43.4	34.6
2	1.50	1.50	9.78	12.63	2.85				
3	2.50	2.50	12.63	16.02	3.39	3.40	0.075	34.0	
4	2.50	2.50	16.02	19.42	3.40				
5	3.50	3.50	19.42	24.16	4.74	4.74	0.124	35.5	
6	3.50	3.50	24.16	28.34	4.18				

EF

Comment:

Sample was taken from fermenter when the fermentation had ended.

1/6/77

Riboflavin Assay No. 167

Gms. Sample 1.0000.

Dilution 1 gm. \rightarrow 250 ml. $\xrightarrow{25\text{ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. gm. yeast
1	2.00	2.00	28.34	31.36	3.02	3.11	0.076	38.0	31.7
2	2.00	2.00	31.36	34.55	3.19				
3	3.00	3.00	34.55	38.48	3.93	3.94	0.102	34.0	
4	3.00	3.00	38.48	42.42	3.94				
5	4.00	4.00	42.42	47.06	4.64	4.68	0.123	35.2	
6	4.00	4.00	47.06	51.72	4.72				

BP Comment: This sample was taken just prior to passing through the system. (The fermenter had stood for approx. 15-hrs.)

Riboflavin Assay No. 168

Qns. Sample 1.0000

Dilution 1 gm. \longrightarrow .250 ml. $\xrightarrow{25 \text{ ml.}}$ 1.00 ml.

6/6/50
JW

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	megs. chart	megs. per gm. yeast	Avg. megms/ gm. yeast
1	2.00	2.00	4.72	7.62	2.90	2.87	0.065	32.5	26.2
2	2.00	2.00	7.72	10.56	2.84				
3	3.00	3.00	10.56	14.33	3.77	3.61	0.092	30.7	
4	3.00	3.00	14.33	17.78	3.45				
5	4.00	4.00	17.78	21.94	4.16	4.23	0.110	27.5	
6	4.00	4.00	21.94	26.23	4.29				

L-4-4

Comment: Sample of dried yeast supposed to be from #1 fermenter - (It may be that this sample may have a mixture of other fermenters in it)

6/6/50
gno

Riboflavin Assay No. 169

Gms. Sample 1.0000

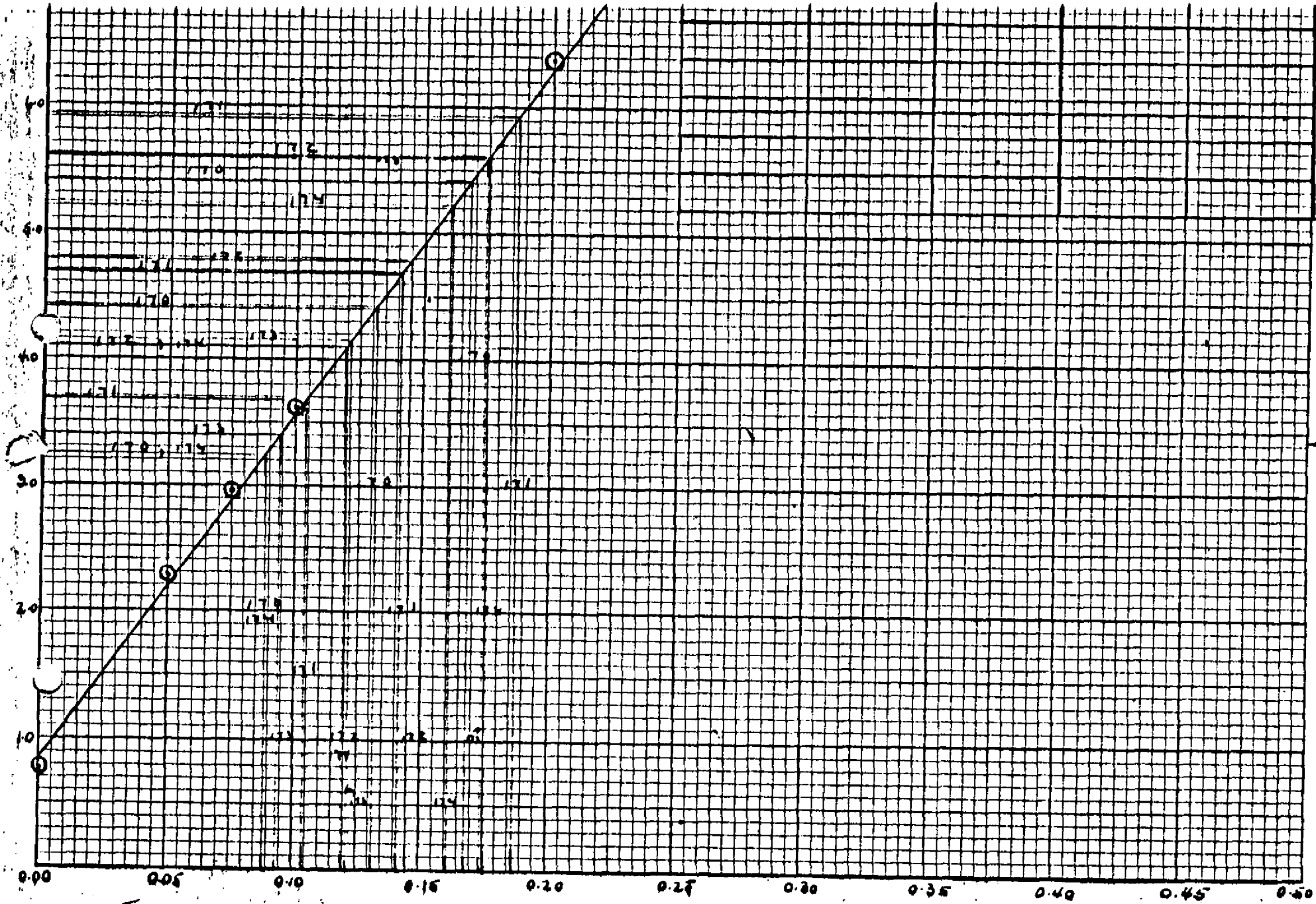
Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1	2.00	2.00	26.23	29.10	2.87	2.97	0.072	36.0	30.5
2	2.00	2.00	29.10	32.17	3.07				
3	3.00	3.00	32.32	36.32	4.00	4.06	0.105	35.0	
4	3.00	3.00	36.32	40.44	4.12				
5	4.00	4.00	40.44	45.31	4.87	4.88	0.130	32.5	
6	4.00	4.00	0.00	4.89	4.89				

24-29

Comment:

Composite sample of production made during week of November 24 to 29th inclusive

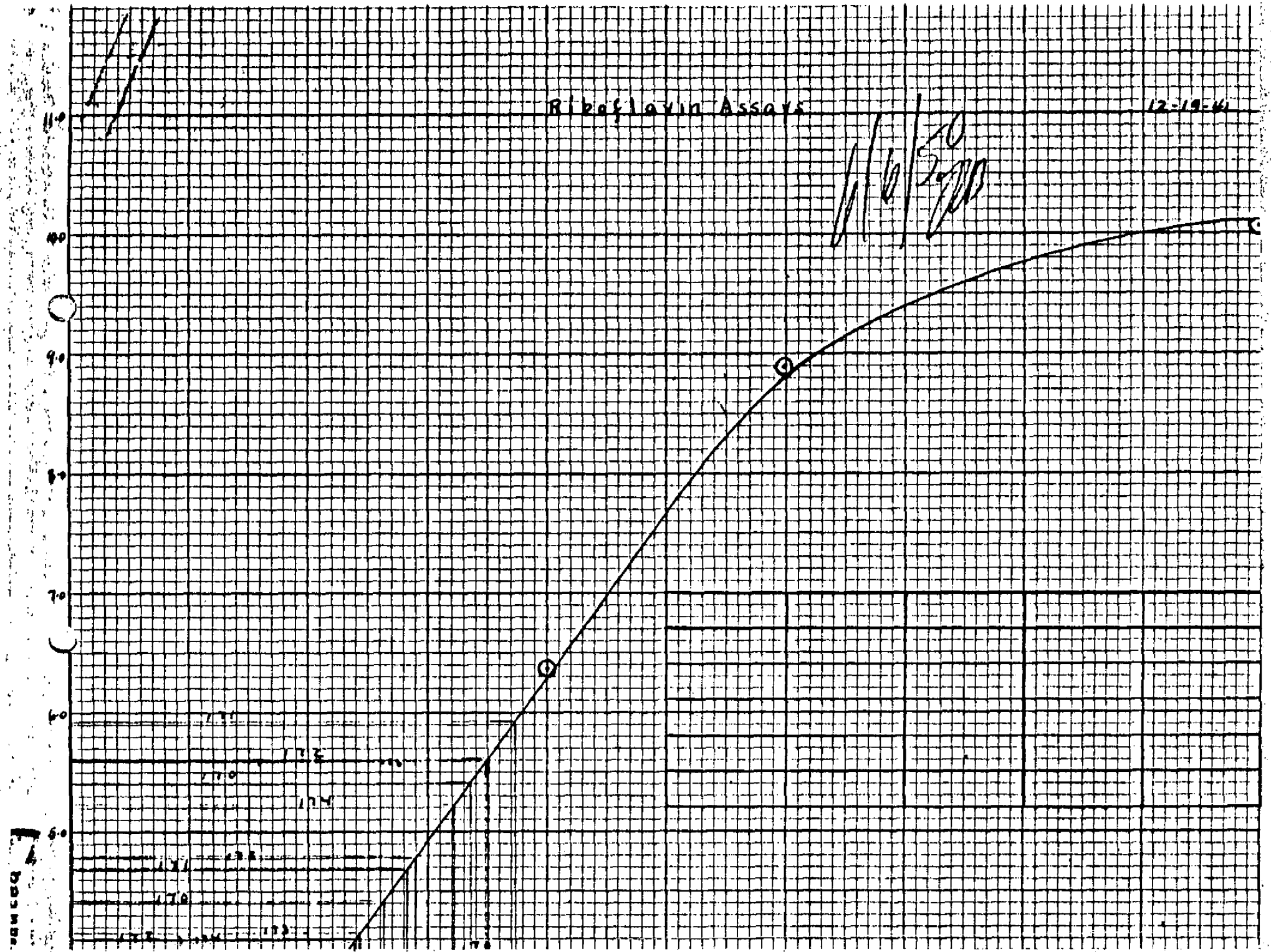


Riboflavin - micrograms/10 ml media.

Riboflavin Assays

12-19-46

11/6/50
JEP



Percent

Standard Curve Data for Riboflavin

Assays Nos. 170, 171, 172, 173 and 174

Tube No.	Synthetic		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1		0.00	0.00	0.84	0.84	
2		0.00	0.84	1.55	0.71	0.78
3		0.50	1.55	4.04	2.49	
4		0.50	4.04	6.32	2.28	2.39
5		0.75	6.32	9.29	2.97	
6		0.75	9.29	12.22	2.93	2.95
7		1.00	12.22	15.61	3.39	
8		1.00	15.61	19.23	3.62	3.51
9		1.50	19.23	23.64	4.41	
10		1.50	23.64	28.03	4.39	4.40
11		2.00	28.03	34.42	6.39	
12		2.00	34.42	41.17	6.75	6.57
13		3.00	41.17	50.07	8.90	8.90
14		5.00	0.07	10.16	10.09	10.09

6/6/50
Jm

Riboflavin Assay No. 170

Gms. Sample

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms. / gm.
1		2.50	10.16	13.32	3.16				30.3
2		2.50	13.32	16.63	3.31	3.24	0.087	34.8	
3		3.50	16.63	20.84	4.21				
4		3.50	20.84	25.48	4.64	4.43	0.132	37.6	
5		5.00	25.48	31.07	5.59				
6		5.00	31.07	36.32	5.25	5.42	0.168	33.6	

EF

Comment: Sample taken at end of Fermentation #1, Fermenter.
sample taken from bottom of fermenter - Bx -1.9 - PH 4.10
temp. 37.5° - alcohol 7.15%

6/6/50
21

Riboflavin Assay No. 171

Qns. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms. / gm.
1		2.50	36.32	40.01	3.69				34.9
2		2.50	40.01	43.68	3.67	3.68	0.104	41.6	
3		3.50	0.28	5.16	4.88				
4		3.50	5.16	9.64	4.48	4.68	0.142	40.6	
5		5.00	9.64	15.80	6.16				
6		5.00	15.80	21.47	5.67	5.93	0.188	37.6	

U.P.
Comment: Sample yeast supposedly from #1 fermenter but may also have been mixed with some of the previous and also later fermenter.
Spot sample.

Riboflavin Assay No. 172

Gms. Sample

Dilution

6/6/50
70

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms. / gm.
1		3.00	21.47	25.61	4.14				31.0
2		3.00	25.61	29.67	4.06	4.10	0.119	39.6	
3		4.00	29.67	34.36	4.69				
4		4.00	34.36	39.22	4.86	4.78	0.145	36.3	
5		5.00	39.22	44.72	5.50				
6		5.00	44.72	50.00	5.28	5.61	0.176	35.2	

12-12
Comment: Same as assay #17, ^{but} pulverized - not as good a sample as #17, so that we cannot say that the pulverizing caused the drop.

6/6/50
20

Riboflavin Assay No. 173

Gms. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1		2.50	5.72	9.20	3.48				30.6
2		2.50	9.20	12.52	3.32	3.40	0.093	37.2	
3		3.50	12.52	16.68	4.16				
4		3.50	16.68	20.84	4.16	4.16	0.122	34.9	
5		5.00	~	~					
6		5.00	20.84	26.43	5.59	5.59	0.174	34.8	

Comment:

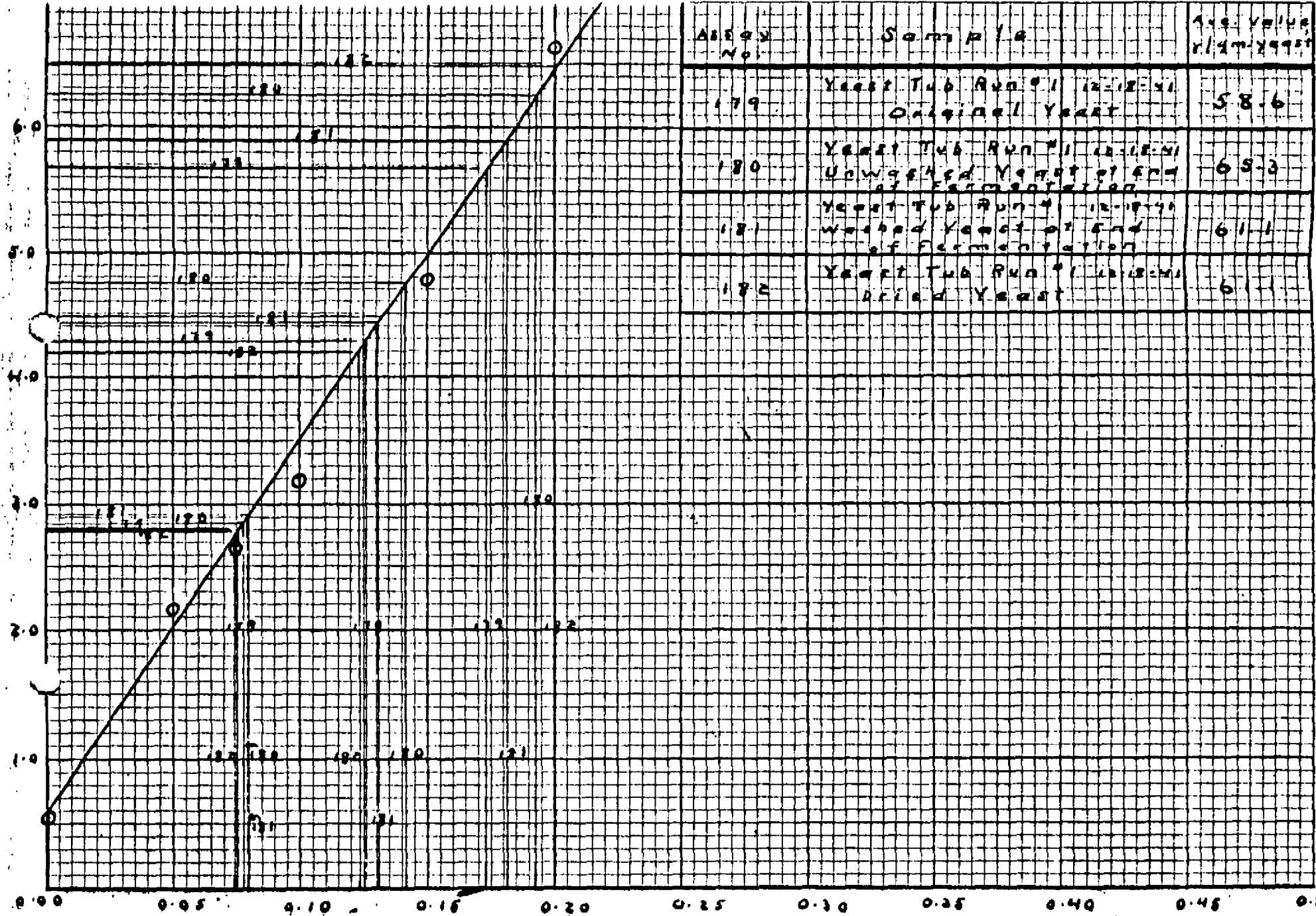
Regular Yeast made in plant (fortified) Dec. 5-7 inches

6/6/50 gms

Riboflavin Assay No. 174
Gms., Sample
Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1		2.50	26.43	29.74	3.31				28.8
2		2.50	29.74	32.94	3.20	3.26	0.027	34.8	
3		3.50	32.94	36.96	4.02				
4		3.50	36.96	41.13	4.17	4.10	0.119	34.1	
5		5.00	41.13	46.38	5.25				
6		5.00	0.00	5.21	5.21	5.23	0.162	32.4	

6-8-11
Comment: Regular yeast made in plants (fortified) Dec. 8-11 inclusive

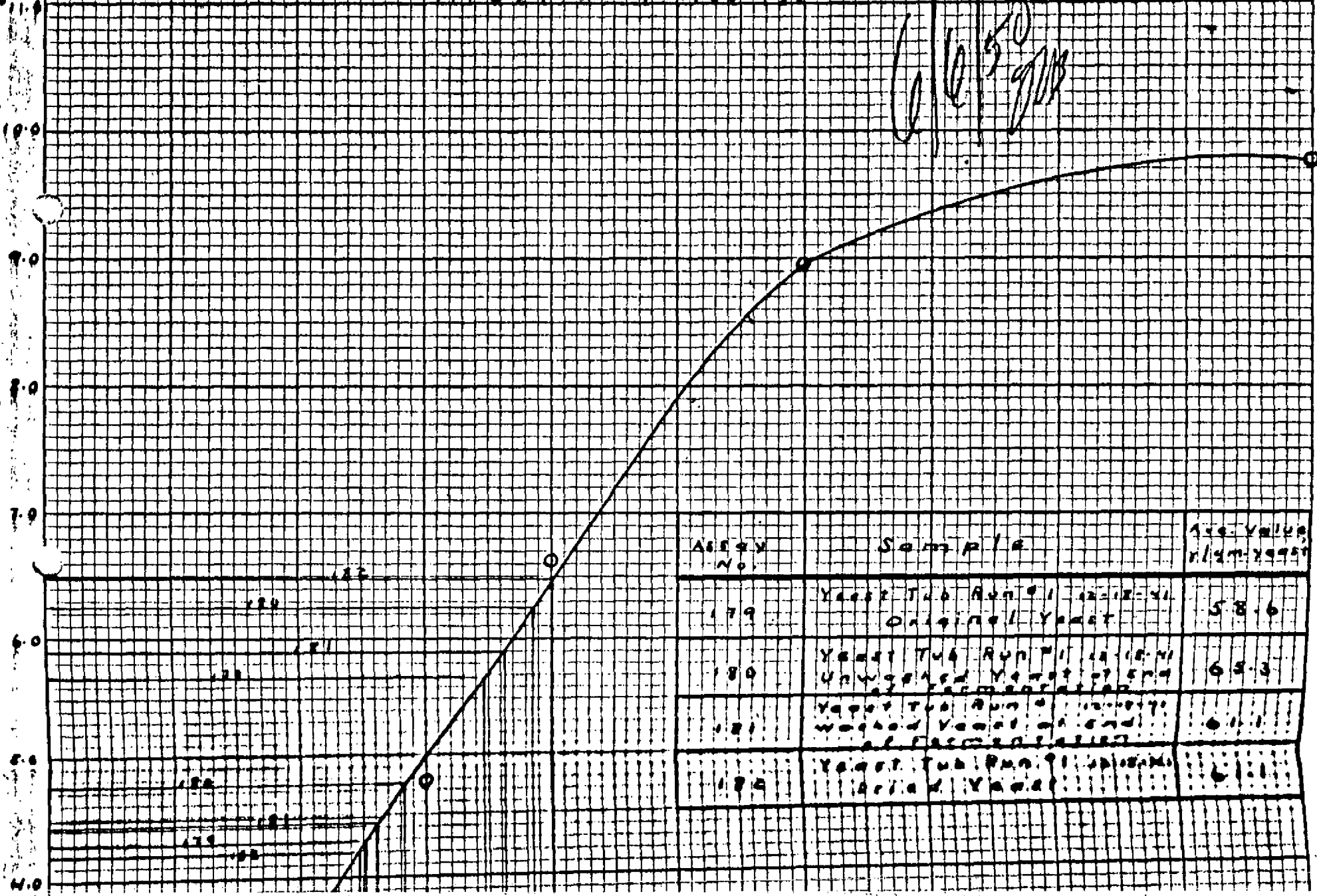


Riboflavin, micrograms / 10ml. media

Riboflavin Assay

12-26-41

6/6/50
JWB



Assay No.	Sample	Ave. Value, r/m-yeast
179	Yeast Tub Run #1 12-12-41 Original Yeast	58.6
180	Yeast Tub Run #1 12-18-41 Unwashed Yeast of end of fermentation	65.3
181	Yeast Tub Run #1 12-18-41 Washed Yeast at end of fermentation	61.1
182	Yeast Tub Run #1 12-18-41 Washed Yeast	61.1

6/6/50
JPD

Standard Curve Data for Riboflavin

Assays Nos. 177, 180, 181 and 182

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mgms.	ml.	Initial Final		Individual	Average
1	0.00	0.00	0.00	0.56	0.56	
2	0.00	0.00	0.56	1.65	1.09	0.56
3	0.05	0.50	1.65	3.97	2.32	
4	0.05	0.50	3.97	6.12	2.15	2.24
5	0.075	0.75	6.12	8.78	2.66	
6	0.075	0.75	8.78	11.38	2.60	2.63
7	0.10	1.00	11.38	14.47	3.09	
8	0.10	1.00	14.47	17.74	3.27	3.18
9	0.15	1.50	17.74	22.44	4.70	
10	0.15	1.50	22.44	27.31	4.87	4.79
11	0.20	2.00	27.31	33.92	6.61	
12	0.20	2.00	33.92	40.74	6.82	6.73
13	0.30	3.00	40.74	49.70	8.96	8.96
14	0.50	5.00	0.00	9.77	9.77	9.77

6/6/50
JMB

Riboflavin Assay No, 179
Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 $\xrightarrow{25\text{ ml}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	1.00	1.00	9.77	12.53	2.76	2.81	0.075	75.0	58.6
2	1.00	1.00	12.53	15.38	2.85				
3	2.00	2.00	15.44	19.67	4.23	4.28	0.156	63.0	
4	2.00	2.00	19.67	24.00	4.33				
5	3.00	3.00	24.00	29.61	5.61	5.67	0.173	57.6	
6	3.00	3.00	29.61	35.34	5.73				

Comment: yeast Tube Run #1 12-18-41

sample of original Red Star yeast.
(dry)

Riboflavin Assay No. 170

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{2.50 \text{ ml.}}$ $\xrightarrow{2.5 \text{ ml.}}$ 100 ml.

6/6/50
JUP

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mcgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms/ gm. yeast
1	1.00	1.00	35.34	38.20	2.86	2.84	0.077	77.0	65.3
2	1.00	1.00	38.50	41.32	2.82				
3	2.00	2.00	41.32	46.06	4.74	4.74	0.142	71.0	
4	2.00	2.00	0.00	4.73	4.73				
5	3.00	3.00	4.73	11.02	6.29	6.26	0.193	64.3	
6	3.00	3.00	11.02	17.25	6.23				

Comment: Yeast Tub Run #1 12-18-41

Sample of unwashed yeast at end of
Fermentation

6/6/50
gud

Riboflavin Assay No. 181
Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms./gm. yeast
1	1.00	1.00	17.25	20.13	2.88	2.93	0.089	89.0	(61.1)
2	1.00	1.00	20.13	23.10	2.97				
3	2.00	2.00	23.10	27.53	4.43	4.43	0.131	65.5	
4	2.00	2.00	27.53	31.95	4.42				
5	3.00	3.00	31.95	37.84	5.89	5.89	0.182	60.6	
6	3.00	3.00	37.84	43.73	5.89				

Comment: yeast Tube Run #1 12-18-41

Sample of washed yeast at end of
Fermentation.

4/6/50
JW

Riboflavin Assay No. 182

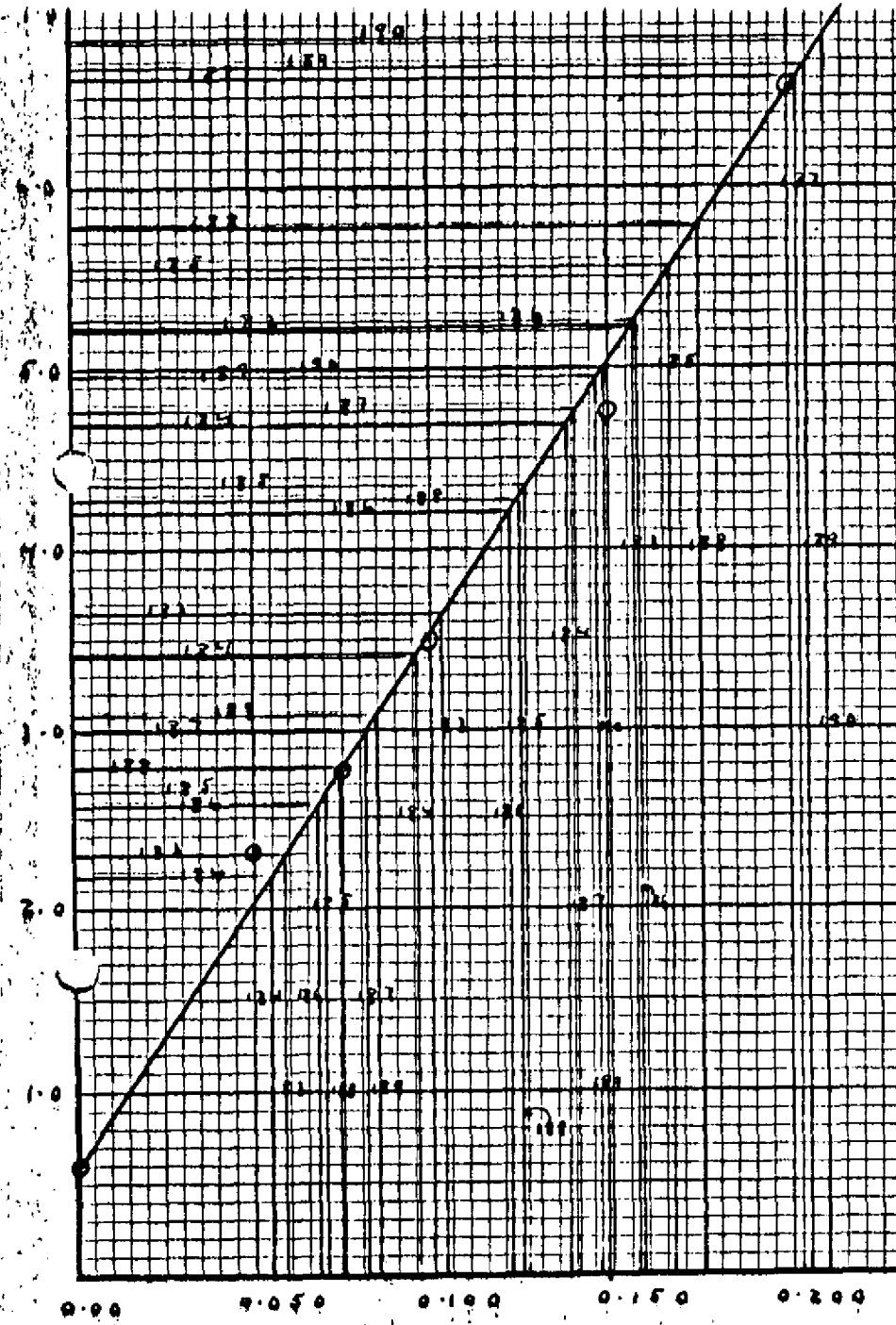
Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms./gm. yeast
1	1.00	1.00	43.73	46.52	2.79	2.79	0.074	74.0	(61.1)
2	1.00	1.00	0.00	2.78	2.78				
3	2.00	2.00	2.78	6.95	4.17	4.19	0.123	61.5	
4	2.00	2.00	6.95	11.15	4.20				
5	3.00	3.00	11.15	17.54	6.39	6.48	0.200	66.6	
6	3.00	3.00	17.54	24.02	6.56				

Comment: yeast Tube Run #1 12-18-41

sample of dried yeast



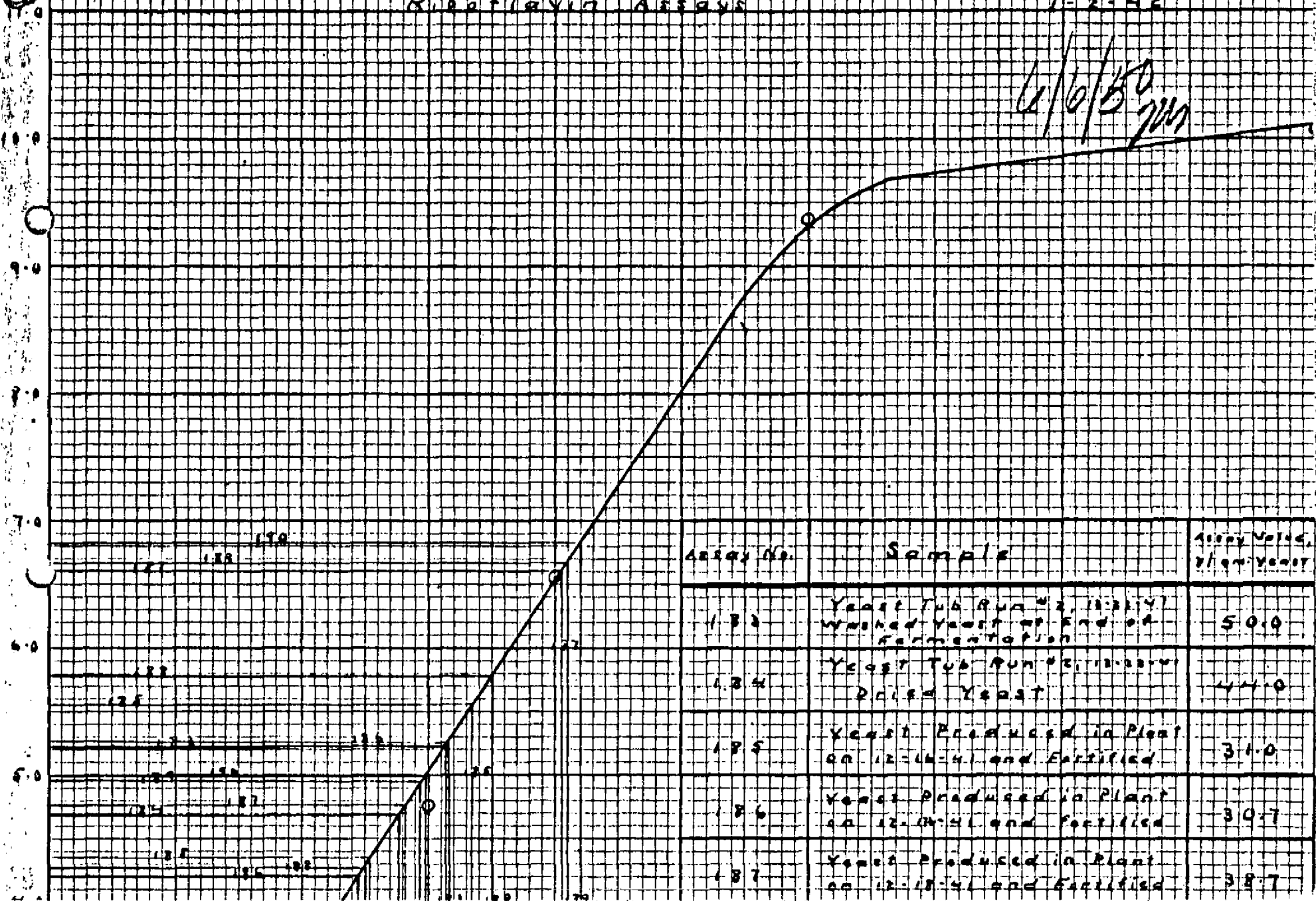
Assay No.	Sample	Alky. Method x 100 Yeast
183	Yeast Tub Run #2, 11-31-41 Washed Yeast at End of Fermentation	50.0
184	Yeast Tub Run #2, 11-31-41 Dried Yeast	44.0
185	Yeast Produced in Plant on 12-14-41 and Fertilized	34.0
186	Yeast Produced in Plant on 12-15-41 and Fertilized	30.7
187	Yeast Produced in Plant on 12-18-41 and Fertilized	38.7
188	Yeast Produced in Plant on 12-19-41 and Fertilized	34.6
189	Yeast Produced in Plant on 12-20-41 and Fertilized	40.0
190	Yeast Produced in Plant on 12-21-41 and Fertilized	40.4

Riboflavin, micrograms / 10ml. media

Riboflavin Assays

1-25-43

6/6/50
JMM



Standard Curve Data for Riboflavin

Assays Nos. 183, 184, 185, 186, 187, 188, 189, and 190

Tube No.	Synthetic		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1		0.00	0.16	0.63	0.47	
2		0.00	0.63	1.33	0.70	0.59
3		0.50	1.33	3.71	2.38	
4		0.50	3.71	6.01	2.31	2.35
5		0.75	6.01	8.92	2.91	
6		0.75	8.92	11.53	2.60	2.76
7		1.00	11.53	15.04	3.51	
8		1.00	15.04	18.50	3.46	3.49
9		1.50	18.50	23.36	4.84	
10		1.50	23.36	28.04	4.68	4.76
11		2.00	28.04	34.42	6.38	
12		2.00	34.42	41.13	6.71	6.55
13		3.00	0.00	9.38	9.38	9.38
14		5.00	9.38	19.44	10.06	10.06

G/6/50
M

Riboflavin Assay No. 183

Gms. Sample

Dilution 1 gm \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 100 ml.

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1		1.00	19.44	21.78	2.34	2.39	0.57	57.0	50.0
2		1.00	21.78	24.22	2.44				
3		2.00	24.22	27.83	3.51	3.64	0.103	51.5	
4		2.00	27.83	31.59	3.76				
5		3.00	31.59	37.01	5.41	5.22	0.157	52.3	
6		3.00	37.01	42.04	5.03				

Comment: yeast Tub Run # 2

sample of washed yeast at end of

Fermentation

6/6/50
RD

Riboflavin Assay No. 184

Gms. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1		1.00	412.04	414.30	2.26	2.27	0.0541	54.0	(414.0)
2		1.00	414.30	416.57	2.27				
3		2.00	0.00	3.412	3.412	3.412	0.0922	416.0	
4		2.00	3.412	6.53	3.11				
5		3.00	6.53	11.15	4.62	4.68	0.138	416.0	
6		3.00	11.15	15.88	4.73				

Comment: yeast Tub Run # 2
sample of Dried yeast

6/6/50
JH

Riboflavin Assay No. 185

Gms. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1		2.00	15.88	18.55	2.67	2.66	0.070	35.0	31.0
2		2.00	18.55	23.20	2.65				
3		3.50	23.20	27.55	4.35	4.35	0.127	36.4	
4		3.50	27.55	31.90	4.35				
5		5.00	31.90	37.50	5.60	5.55	0.168	33.6	
6		5.00	37.50	43.00	5.50				

Comment: yeast produced in plant on 12-16-41
and Fortified

4/6/50
JH

Riboflavin Assay No. 186

Qns. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgns.	ml.	Initial	Final	Individual	Average	mgns. chart	mgns. per gm.	Avg. mgns/ gm.
1		2.00	45.00	45.57	2.57	2.57	0.068	34.0	30.7
2		2.00	45.57	48.14	2.57				
3		3.50	4.00	4.33	4.33	4.20	0.123	35.3	
4		3.50	4.33	8.40	4.07				
5		5.00	8.40	13.69	5.29	5.26	0.158	31.6	
6		5.00	13.69	18.91	5.22				

Comment: yeast produced in plant on 12-17-41
and Fortified

6/6/50
MD

Riboflavin Assay No. 177

Gns. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1		2.00	18.91	21.86	2.95	2.99	0.082	41.0	38.7
2		2.00	21.86	24.82	3.02				
3		3.50	24.82	29.77	4.89	4.76	0.141	40.4	
4		3.50	29.77	34.40	4.63				
5		5.00	34.40	40.96	6.56	6.60	0.203	40.6	
6		5.00	40.96	47.60	6.64				

Comment: yeast produced in Plant on 12-18-41
and Fortified.

4/6/58
JLD

Riboflavin Assay No. 188

Gms. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms/ gm.
1		2.00	0.00	2.72	2.72	2.79	0.074	37.0	34.6
2		2.00	2.72	5.58	2.86				
3		3.50	5.98	10.23	4.25	4.26	0.126	36.1	
4		3.50	10.23	14.50	4.27				
5		5.00	14.50	20.44	5.94	5.77	0.176	35.2	
6		5.00	20.44	26.04	5.60				

Comment:

yeast produced in plant on 12-19-41
and Fortified.

6/6/50
M

Riboflavin Assay No. 190

Qns. Sample

Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms. / gm.
1		2.00	6.70	9.80	3.10	3.07	0.085	42.5	(40.4)
2		2.00	9.90	12.94	3.04				
3		3.50	12.94	17.88	4.94	4.99	0.149	42.7	
4		3.50	17.88	22.91	5.03				
5		5.00	22.91	29.73	6.82	6.82	0.210	42.0	
6		5.00	29.73	36.55	6.82				

Comment: yeast produced in plant on 12-21-41
and Fortified

6/6/50
JW

Riboflavin Assay No. 189

Gms. Sample

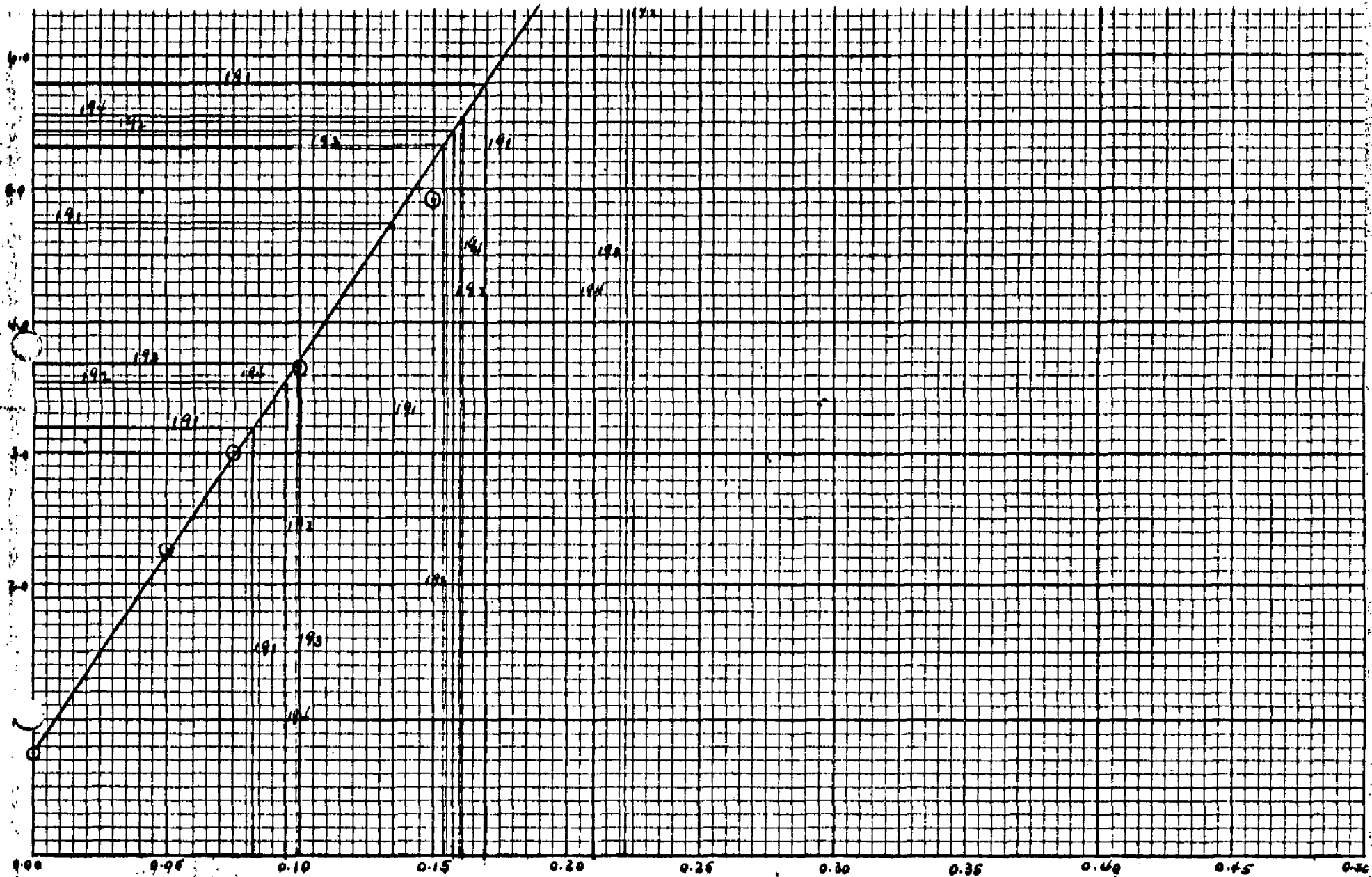
Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1		2.00	26.04	29.14	3.10	3.08	0.085	42.5	(40.0)
2		2.00	29.14	32.20	3.06				
3		3.50	32.20	37.10	4.90	4.95	0.147	42.1	
4		3.50	37.10	42.10	5.00				
5		5.00	42.10	48.75	6.65	6.66	0.205	41.1	
6		5.00	0.02	6.70	6.68				

Comment: yeast produced in plant on 12-20-41
and Fortified.

6/6/50
m

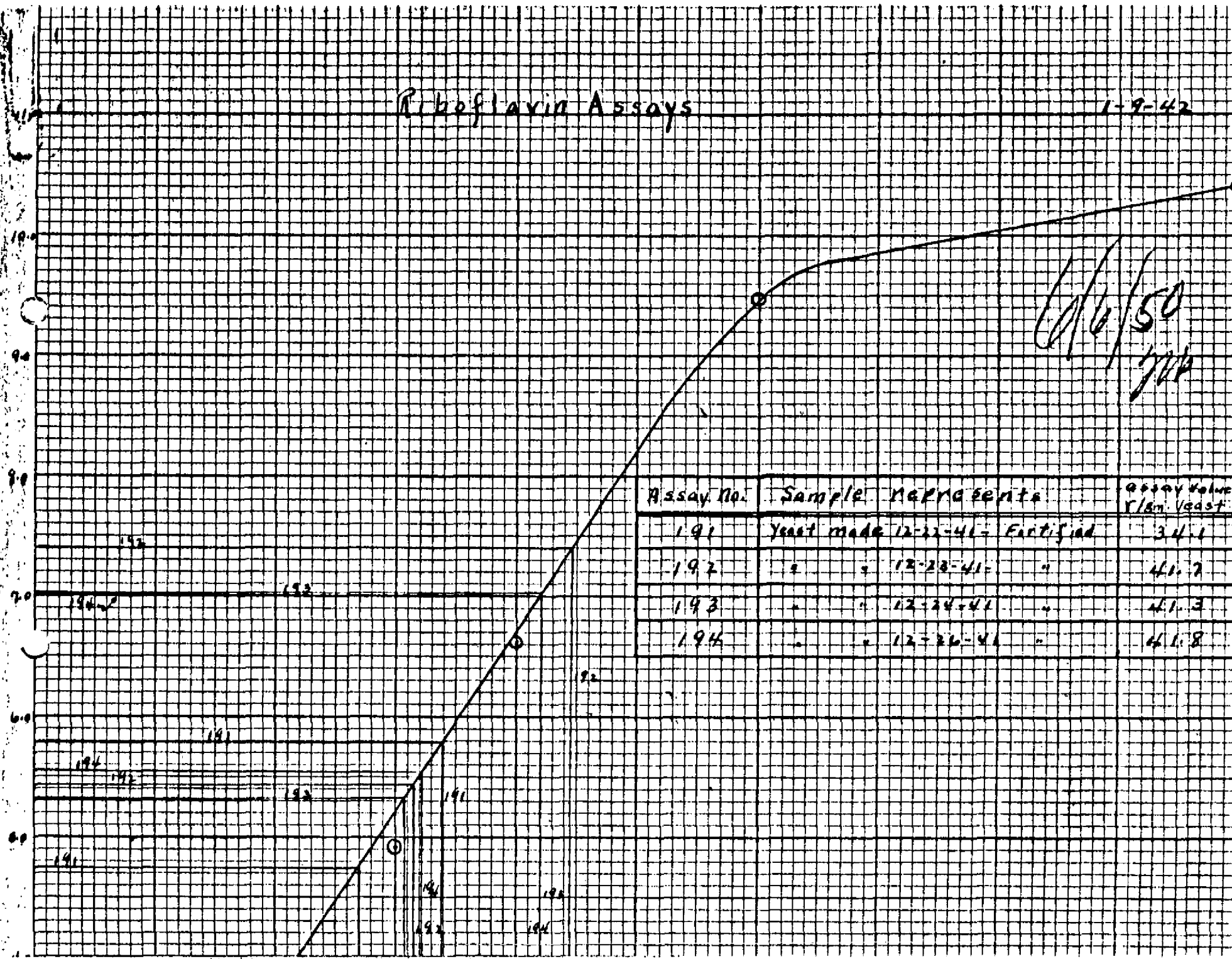
acid produced



Riboflavin — micrograms/10ml media

Riboflavin Assays

1-9-42



Assay No.	Sample Represents	Assay Value Y/Lm. Yeast
191	Yeast made 12-22-41 - Fertilized	34.1
192	" " 12-23-41 - "	41.7
193	" " 12-24-41 - "	41.3
194	" " 12-26-41 - "	41.8

Standard Curve Data for Riboflavin

Assays Nos. 191, 192, 193 and 194

6/6/50
JW

Tube No.	Synthetic		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1		0.00	0.23	1.00	0.77	
2		0.00	1.00	1.74	0.74	0.76
3		0.50	1.74	4.01	2.27	
4		0.50	4.01	6.47	2.46	2.37
5		0.75	6.47	9.60	3.13	
6		0.75	9.60	12.60	3.00	3.07
7		1.00	12.74	16.37	3.63	
8		1.00	16.37	19.87	3.50	3.57
9		1.50	19.87	25.32	5.47	
10		1.50	25.32	29.58	4.36	4.91
11		2.00	29.58	36.39	6.81	
12		2.00	36.39	42.80	6.41	6.61
13		3.00	0.13	9.61	9.48	9.48
14		5.00	9.61	20.02	10.41	10.41

Riboflavin Assay No. 171

Gms. Sample

Dilution 1 gm. → 250 ml. → 100 ml.

6/6/50
JW

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms/ gm.
1		2.00	20.00	23.30	3.28	3.19	0.083	41.5	34.1
2		2.00	23.30	26.40	3.10				
3		3.50	26.40	31.17	4.77	4.74	0.135	38.8	
4		3.50	31.17	35.87	4.70				
5		5.00	35.87	41.70	5.83	5.79	0.170	34.0	
6		5.00	41.70	47.45	5.75				

Comment: Yeast made 12-22-41- Fortified.

Riboflavin Assay No. 192

Gms. Sample

Dilution

6/6/50
MD

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1		2.00	0.00	3.49	3.49	3.55	0.095	47.5	41.7
2		2.00	3.49	7.10	3.61				
3		3.50	7.10	12.32	5.22	5.42	0.157	45.1	
4		3.50	12.32	17.94	5.62				
5		5.00	17.94	25.29	7.35	7.40	0.222	44.4	
6		5.00	25.29	32.73	7.44				

Comment: Yeast made 12-23-41 - Fortified

Riboflavin Assay No. 193

Gms. Sample

Dilution

6/6/50
JWA

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1		2.00	32.73	36.54	3.81	3.69	0.099	49.5	41.3
2		2.00	36.54	40.10	3.56				
3		3.50	40.10	45.41	5.31	5.21	0.154	44.3	
4		3.50	0.00	5.31	5.31				
5		5.00	5.31	12.10	6.79	7.01	0.210	42.0	
6		5.00	12.10	19.32	7.22				

Comment: Yeast made 12-24-41 - Fortified

Riboflavin Assay No. 194

Gms. Sample

Dilution

6/6/50
JMD

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1		2.00	19.32	22.89	3.57	3.61	0.098	49.0	41.8
2		2.00	22.89	26.54	3.65				
3		3.50	26.54	32.10	5.56	5.52	0.161	46.3	
4		3.50	32.10	37.57	5.47				
5		5.00	37.57	44.72	7.15	7.02	0.210	42.0	
6		5.00	0.00	6.88	6.88				

Comment:

Yeast made 12-26-41 - Fortified.

1-17-42

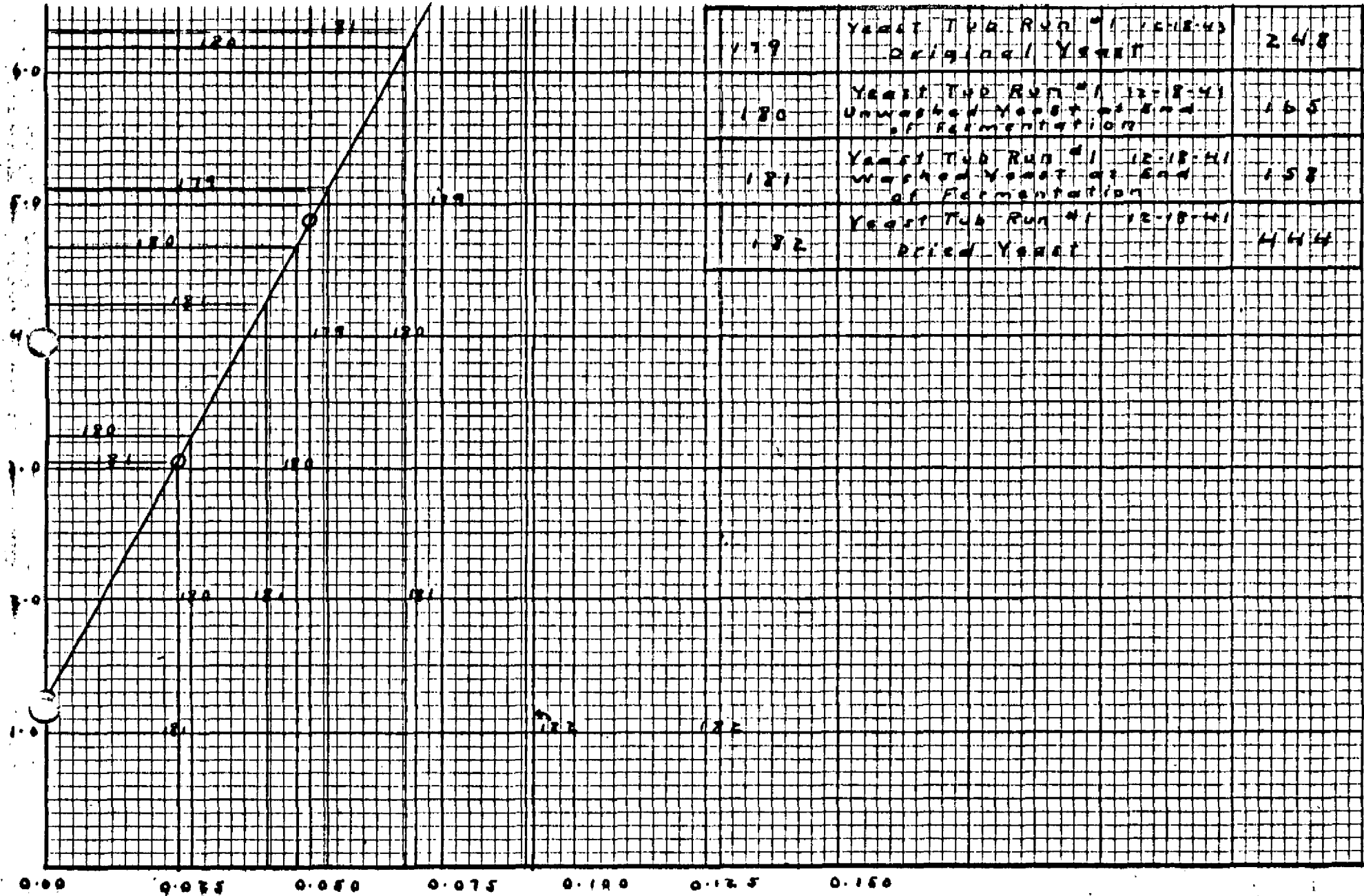
6/6/50
20

Thiamine Assay No. 2

Gms. Sample
Dilution

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms. / gm.
1									30.0
2									
3									
4									
5									
6									

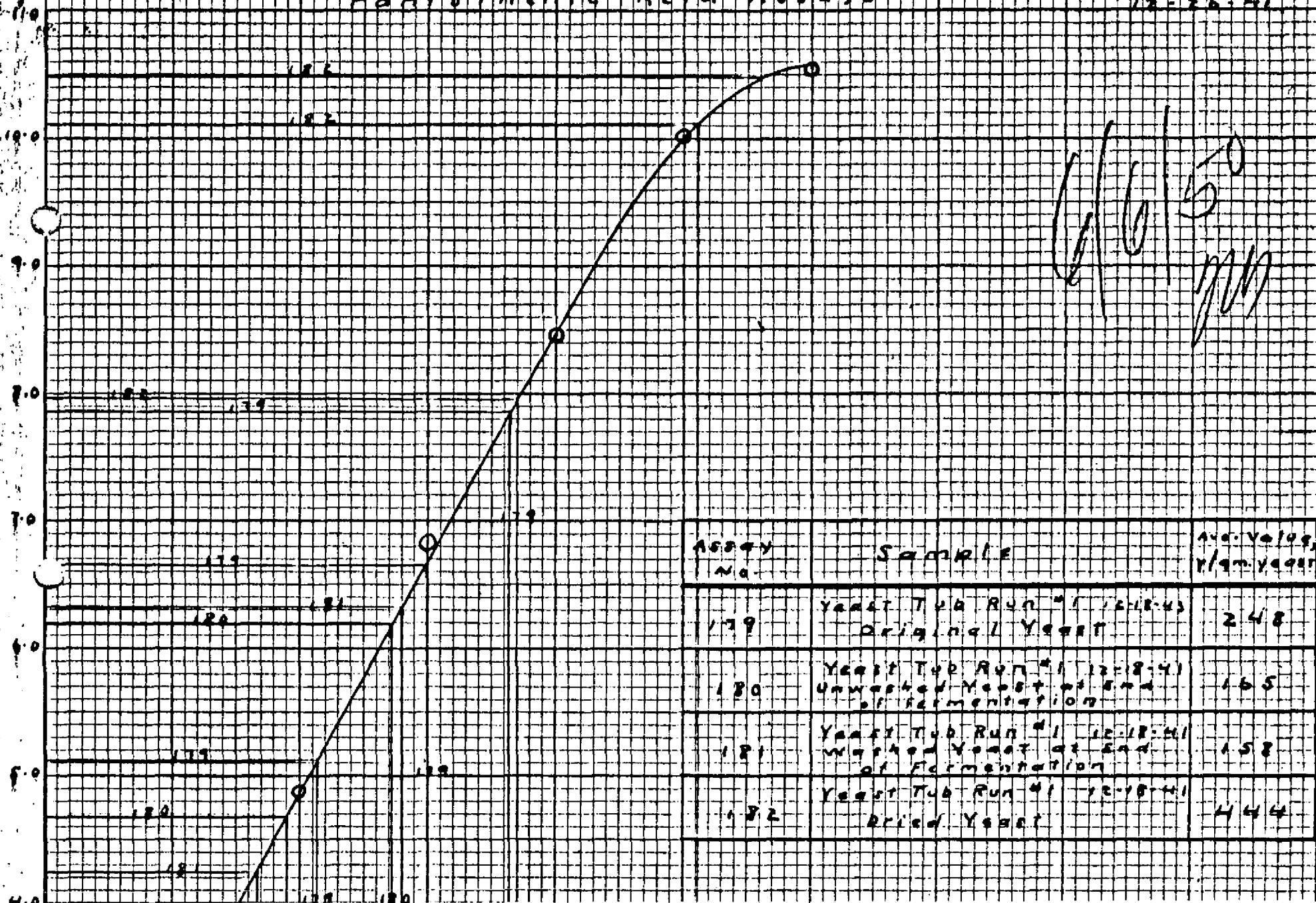
Comment: Sample assayed represents yeast produced in our plant Jan. 7-8-9 - (Composite).
Three digestions were tried - H_2SO_4 - H_2O - Chlorine
 H_2SO_4 and H_2O checked very well.



Calcium Pantothenate, micrograms/10ml. media

Pantothenic Acid Assays

12-26-41



Assay No.	Sample	Ave. Value, μ /gm. Yeast
119	Yeast Tub Run #1 12-18-41 Original Yeast	2.48
120	Yeast Tub Run #1 12-18-41 Unwashed Yeast at End of Fermentation	1.65
121	Yeast Tub Run #1 12-18-41 Washed Yeast at End of Fermentation	1.52
122	Yeast Tub Run #1 12-18-41 Dried Yeast	4.44

Standard Curve Data for Pantothenic Acid

Assays Nos. 179, 180, 181 and 182.

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	24.08	25.35	1.27	
2	0.000	0.00	25.55	26.83	1.28	1.28
3	0.025	0.50	26.83	29.91	3.07	
4	0.025	0.50	29.90	32.90	3.00	3.04
5	0.050	1.00	32.90	37.72	4.82	
6	0.050	1.00	37.72	42.65	4.93	4.88
7	0.075	1.50	42.65	49.72	7.07	
8	0.075	1.50	0.00	6.58	6.58	6.83
9	0.100	2.00	6.58	14.92	8.34	
10	0.100	2.00	14.92	23.48	8.56	8.45
11	0.125	2.50	23.48	33.37	9.89	
12	0.125	2.50	33.37	43.49	10.12	10.01
13	0.150	3.00	0.00	10.58	10.58	
14	0.150	3.00	10.58	21.12	10.54	10.56

6/6/50
JED

Pantothenic Acid Assay No. 179

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{5 \text{ ml.}}$ 250 ml. $\xrightarrow{100 \text{ ml.}}$

6/4/58
JTB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.20	1.00	21.12	26.07	4.95	5.12	0.053	265	248
2	0.20	1.00	26.07	31.35	5.28				
3	0.30	1.50	31.35	38.14	6.79	6.66	0.075	250	
4	0.30	1.50	38.14	44.67	6.53				
5	0.40	2.00	0.00	7.93	7.93	7.85	0.091	228	
6	0.40	2.00	7.93	15.69	7.76				

Comment: yeast Tube Run #1

12-18-41

Sample of original Red Star yeast
3(dry)

Pantothenic Acid Assay No. 170

Gms. Sample 1.0999

Dilution 1 gm. $\xrightarrow{5 \text{ ml.}}$ 250 ml. $\xrightarrow{100 \text{ ml.}}$

6/6/50
MD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Found Acid		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.20	1.00	15.69	18.82	3.13	3.24	0.027	135	(165)
2	0.20	1.00	18.82	22.17	3.35				
3	0.30	2.00	22.17	26.70	4.53	4.67	0.048	160	
4	0.30	2.00	26.70	31.50	4.80				
5	0.40	3.00	31.50	36.58	6.08	6.19	0.068	170	
6	0.40	3.00	36.58	42.88	6.30				

Comment: yeast Turb Run #1

12-18-41

sample of unwashed yeast at end of fermentation

Pantothenic Acid Assay No. 181

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{5 \text{ ml.}}$ 100 ml.

6/6/50
ND

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	0.20	1.00	0.35	3.40	3.05	3.02	0.025	125	(158)
2	0.20	1.00	3.40	6.39	2.99				
3	0.30	2.00	6.39	10.82	4.43	4.23	0.042	140	
4	0.30	2.00	10.82	14.85	4.03				
5	0.40	3.00	14.85	21.24	6.39	6.33	0.070	175	
6	0.40	3.00	21.24	27.50	6.26				

Comment: yeast Tube Run #1

12-18-41

Sample of Washed yeast at End of Fermentation

6/6/50
JL

Pantothenic Acid Assay No. 182

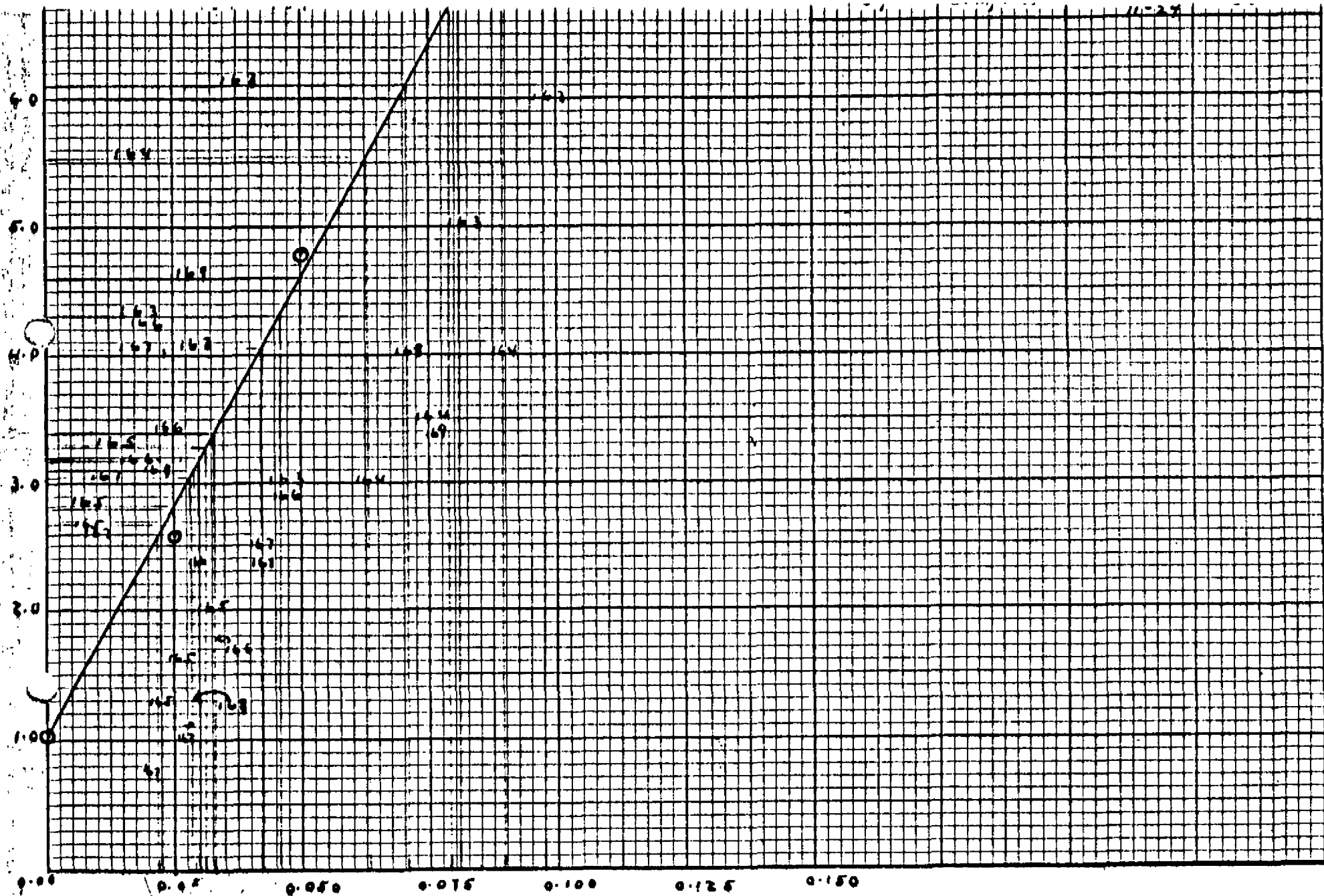
Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{5 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. per chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	0.20	1.00	27.50	35.63	8.13	7.97	0.092	460	444
2	0.20	1.00	35.63	43.54	7.81				
3	0.30	2.00	0.20	10.43	10.23	10.11	0.128	427	
4	0.30	2.00	10.43	20.42	9.99				
5	0.40	3.00	20.42	30.83	10.41	10.48	~	~	
6	0.40	3.00	30.83	41.38	10.55				

Comment: yeast Tub Run #1 12-18-41

sample of dried yeast

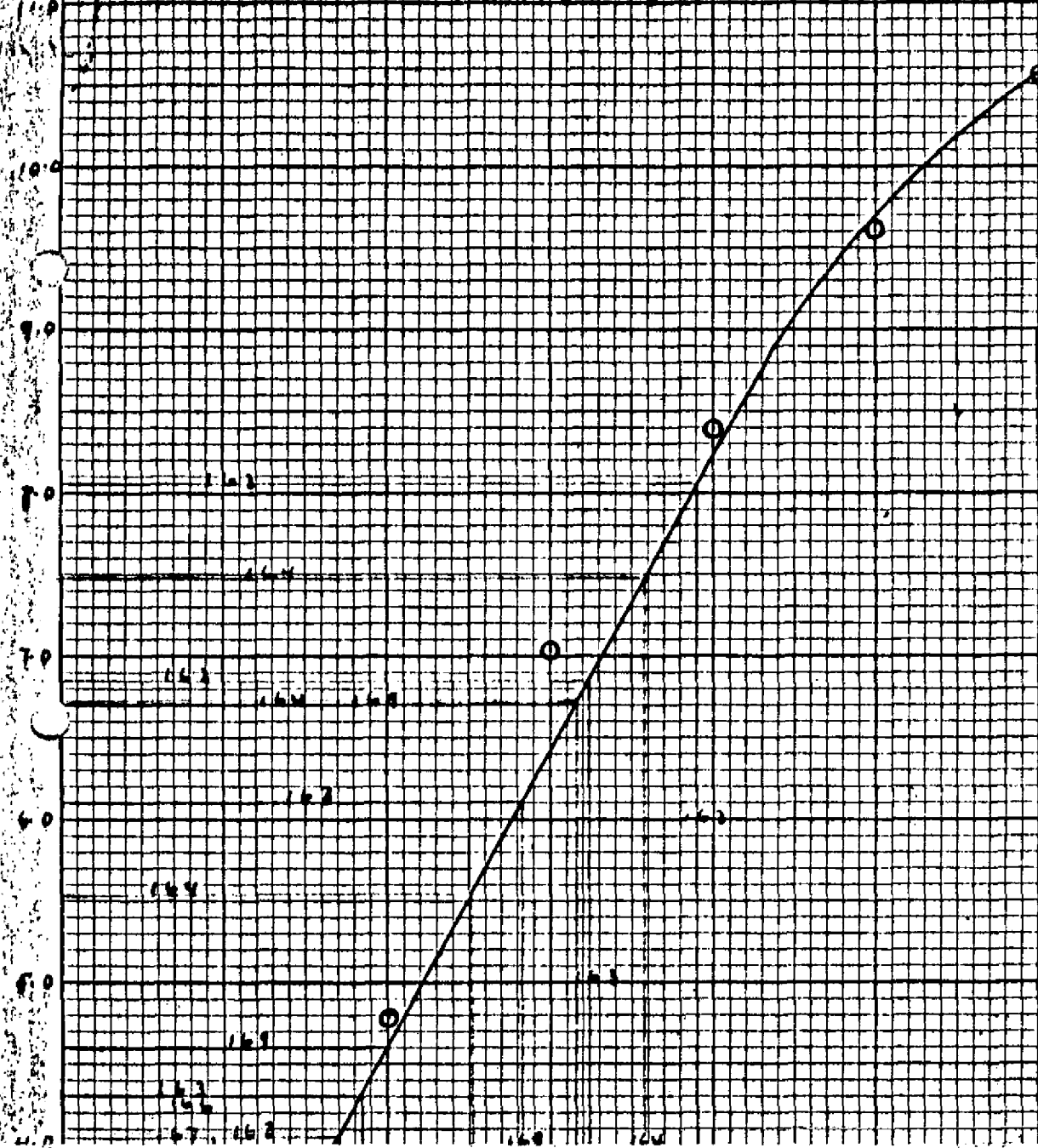


10-25

Pantothenic Acid Assays

12-11-41

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Assay No.	Sample No.	Date Made	Assay Value, γ gm. yeast
163	original Yeast		248
164	Yeast Tub		259
165	8.5 Brix		91
166	and 95 fermentation		80
167	Basore Processing		71
168	Dried Yeast		62
169	Composite	11-24 to 11-29	68

Standard Curve Data for Pantothenic Acid

Assays Nos.

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	4.89	5.73	0.84	
2	0.000	0.00	5.73	6.92	1.21	1.03
3	0.025	0.50	6.92	9.41	2.49	
4	0.025	0.50	9.41	12.09	2.68	2.59
5	0.050	1.00	12.09	16.88	4.79	
6	0.050	1.00	16.88	21.67	4.79	4.79
7	0.075	1.50	21.67	28.76	7.09	
8	0.075	1.50	28.76	35.72	6.96	7.03
9	0.100	2.00	35.72	44.02	8.30	
10	0.100	2.00	0.00	8.47	8.47	8.39
11	0.125	2.50	8.47	18.04	9.57	
12	0.125	2.50	18.04	27.68	9.64	9.61
13	0.150	3.00	27.68	38.25	10.57	
14	0.150	3.00	38.25	48.80	10.55	10.56

6/6/50
JW

Pantothenic Acid Assay No. 163

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 5 ml. → 100 ml.

6/6/50
JLD

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1	0.20	1.00	0.00	4.20	4.20	4.31	0.046	23.0	24.8
2	0.20	1.00	4.20	8.64	4.44				
3	0.30	1.50	8.64	15.49	6.85	6.86	0.081	27.0	
4	0.30	1.50	15.49	22.35	6.86				
5	0.40	2.00	22.35	30.39	8.04	8.04	0.098	24.5	
6	0.40	2.00	30.39	38.42	8.03				

Comment: Sample was taken from 1st cake of yeast used to seed the tubs. (Red Star)

Pantothenic Acid Assay No. 164

Gms. Sample

Dilution 1 gm. → 250 ml. → 100 ml.

6/6/50
JMB

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms. / gm.
1	0.20	1.00	38.42	44.33	5.91				259
2	0.20	1.00	0.14	5.31	5.17	5.54	0.058	290	
3	0.30	1.50	5.31	12.05	6.74				
4	0.30	1.50	12.05	18.76	6.71	6.73	0.079	263	
5	0.40	2.00	18.76	26.32	7.56				
6	0.40	2.00	26.32	33.69	7.37	7.47	0.089	223	

YT Comment: Sample was taken from yeast tub.

Pantothenic Acid Assay No. 165

Qms. Sample

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{5 \text{ ml.}}$ 100 ml.

6/6/50
JMB

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms. / gm.
1	0.20	1.00	33.69	36.34	2.65				(91)
2	0.20	1.00	36.34	39.04	2.70	2.68	0.022	110	
3	0.30	1.50	39.04	41.80	2.76				
4	0.30	1.50	41.80	44.67	2.87	2.83	0.025	84	
5	0.40	2.00	44.67	47.88	3.21				
6	0.40	2.00	0.19	3.53	3.34	3.27	0.021	78	

8.5
Comment: Sample was taken from #1 Fermenter when the brix had dropped to 8.5.

Pantothenic Acid Assay No. 166

Gms. Sample

Dilution 1 gm. \longrightarrow 250 ml. \longrightarrow 140 ml.

6/6/50
YAB

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1	0.20	1.00	3.53	6.71	3.18				80
2	0.20	1.40	6.81	9.98	3.17	3.18	0.030	150	
3	0.40	2.00	9.98	13.34	3.36				
4	0.40	2.00	13.34	16.75	3.41	3.39	0.033	83	
5	0.60	3.00	16.75	21.12	4.37				
6	0.60	3.00	21.12	25.38	4.26	4.32	0.046	77	

EF
Comment: Sample was taken from #1 Fermenter when the fermentation had ended.

6/6/50
JMD

Paratothenic Acid Assay No. 167

Gms. Sample

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{5 \text{ ml.}}$ 1000 ml.

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1	0.20	1.00	25.38	28.27	2.89				(71)
2	0.20	1.00	28.27	31.07	2.80	2.60	0.021	105	
3	0.40	2.00	31.07	34.04	2.97				
4	0.40	2.00	34.04	37.17	3.13	3.05	0.028	70	
5	0.60	3.00	37.17	41.67	3.90				
6	0.60	3.00	41.67	45.23	4.16	4.03	0.043	72	

BP

Comment: Sample was taken from #1 Fermenter just prior to being passed thru system - (Fermenter had stood approx. 15 hours).

4/6/50
gub

Pantothenic Acid Assay No. 168

Gms. Sample

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{10\text{-ml}}$ 100 ml.

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1	0.40	1.00	0.00	3.27	3.27				
2	0.40	1.00	3.27	6.20	2.93	3.10	0.024	73	
3	0.80	2.00	6.20	10.21	4.01				
4	0.80	2.00	10.21	14.23	4.02	4.02	0.043	54	
5	1.20	3.00	14.23	20.38	6.15				
6	1.20	3.00	20.38	26.42	6.04	6.10	0.071	59	

62

6-4-4
Comment: Sample was dried yeast supposed to represent #1
Fermenter - there is a possibility that other material may
be mixed in the sample.

Prothemic Acid Assay No. 169

Gms. Sample

Dilution 1 gm. → 250 ml. → 100 ml.

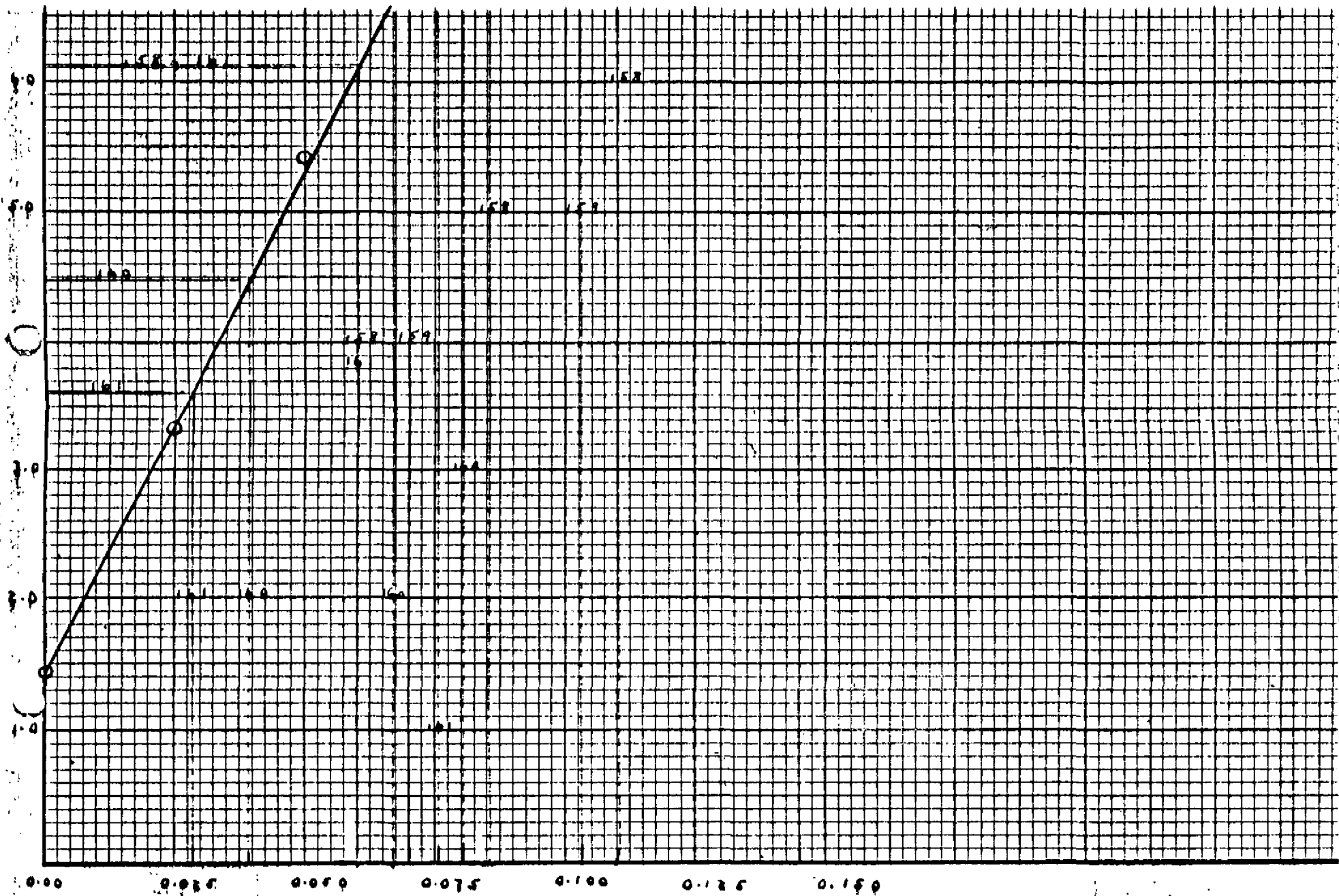
11/6/50
JH

Tube No.	Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1	0.40	1.00	26.42	29.69	3.27				
2	0.40	1.00	29.69	32.83	3.14	3.21	0.030	75	
3	0.80	2.00	32.83	37.50	4.67				
4	0.80	2.00	37.50	42.03	4.53	4.60	0.050	63	
5	1.20	3.00	42.03	48.74	6.71				
6	1.20	3.00	0.11	6.80	6.69	6.70	0.079	660	

68

Comment: Composite Sample of Production made in plant during week of November 24 to 29 inclusive.

Acid produced $\frac{\mu}{\text{ml}}$ of media



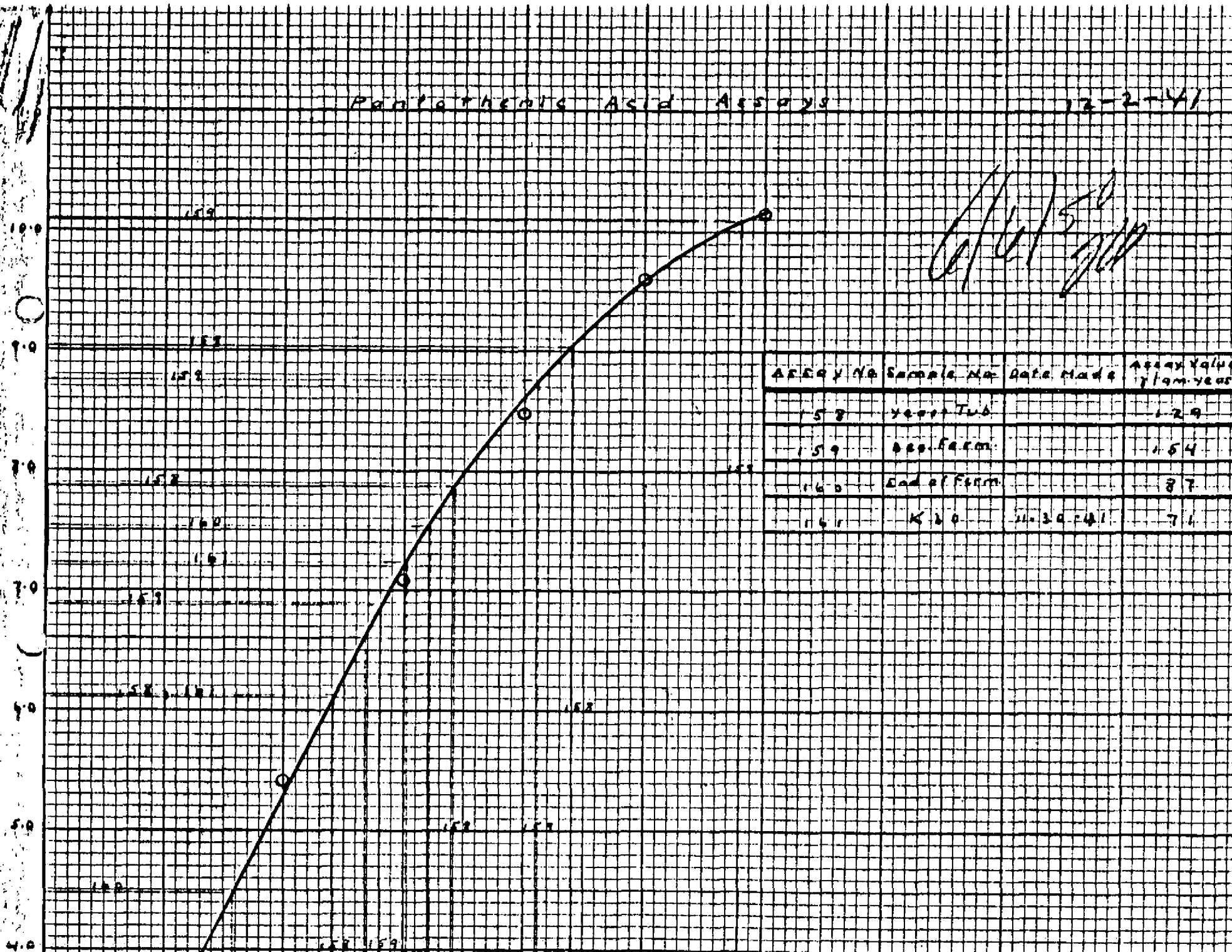
d-Calcium Pantothenate, micrograms / 10 ml media

Parlathene's Acid Assays

12-2-41

6/6/50
JLP

MAN. NO. 101010



Standard Curve Data for Pantothenic Acid

Assays Nos. 157, 159, 160 and 161.

6/6/50
JLB

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	17.57	19.13	1.56	
2	0.000	0.00	19.13	20.43	1.30	1.43
3	0.025	0.50	20.43	23.96	3.53	
4	0.025	0.50	23.96	27.06	3.10	3.32
5	0.050	1.00	27.06	32.56	5.50	
6	0.050	1.00	32.56	37.93	5.37	5.44
7	0.075	1.50	37.93	44.94	7.01	
8	0.075	1.50	0.32	7.48	7.16	7.09
9	0.100	2.00	7.48	16.20	8.72	
10	0.100	2.00	16.33	24.57	8.24	8.48
11	0.125	2.50	24.57	34.52	9.95	
12	0.125	2.50	34.52	44.13	9.61	9.61
13	0.150	3.00	0.00	10.10	10.10	
14	0.150	3.00	10.10	20.31	10.21	10.16

Pantothenic Acid Assay No. 158

Gms. Sample 1.0000

Dilution 1 gm. \rightarrow 250 ml. \rightarrow 100 ml.

6/6/50
JB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.40	1.00	20.31	26.40	6.09	6.12	0.060	150	129
2	0.40	1.00	26.40	32.55	6.15				
3	0.80	2.00	32.60	40.62	8.02	7.87	0.086	108	
4	0.80	2.00	40.72	48.44	7.72				
5	1.20	3.00	0.00	9.04	9.04	9.04	0.111	93	
6	1.20	3.00	9.04	18.07	9.03				

Comment:

Pantothenic Acid Assay No. 159

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{5\text{ ml.}}$ 50 ml.

6/6/50
700

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.40	1.00	18.07	24.97	6.90	6.88	0.070	175	154
2	0.40	1.00	24.97	31.83	6.86				
3	0.80	2.00	32.01	40.77	8.76	8.75	0.103	129	
4	0.80	2.00	40.77	49.53	8.76				
5	1.20	3.00	0.00	10.02	10.02	10.09	~	~	
6	1.20	3.00	10.02	20.18	10.16				

Comment:

Rantithenic Acid Assay No. 160

Gas. Sample 0.960

Dilution 0.960 gm \longrightarrow 250 ml $\xrightarrow{5\text{ ml}}$ 50 ml

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Rantuthenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.384	1.00	20.18	24.61	4.43	4.47	0.038	99	87
2	0.384	1.00	24.61	29.11	4.50				
3	0.768	2.00	29.51	36.05	6.54	6.60	0.067	87	
4	0.768	2.00	36.05	42.70	6.65				
5	1.152	3.00	42.90	50.30	7.40	7.53	0.081	71	
6	1.152	3.00	0.35	8.00	7.65				

Comment:

Pantothenic Acid Assay No. 161

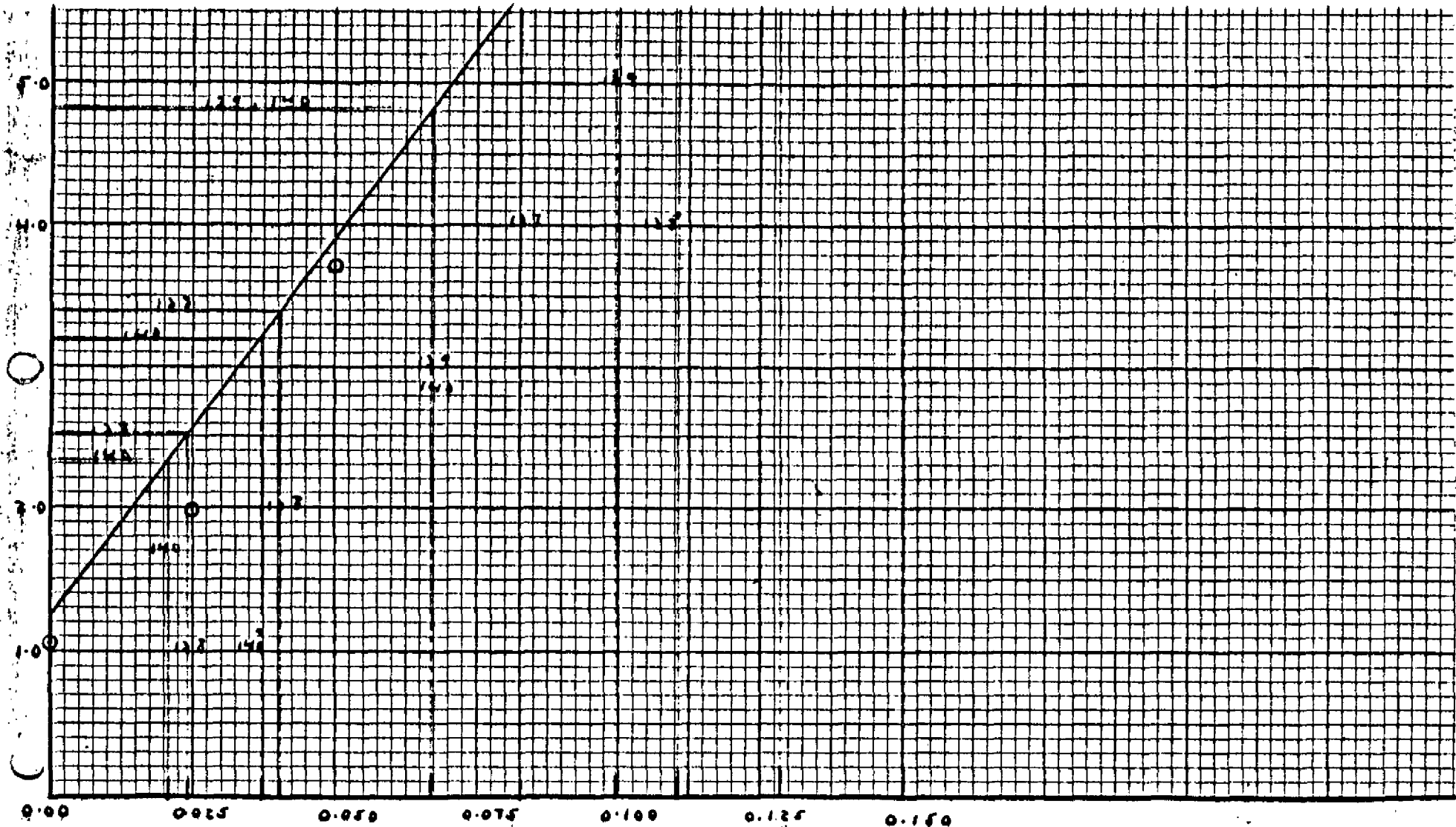
Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	0.40	1.00	0.00	3.91	3.91	3.62	0.029	73	(71)
2	0.40	1.00	3.91	7.25	3.34				
3	0.80	2.00	7.25	13.47	6.22	6.13	0.060	75	
4	0.80	2.00	13.47	19.51	6.04				
5	1.20	3.00	19.51	26.74	7.23	7.24	0.076	64	
6	1.20	3.00	26.74	33.98	7.24				

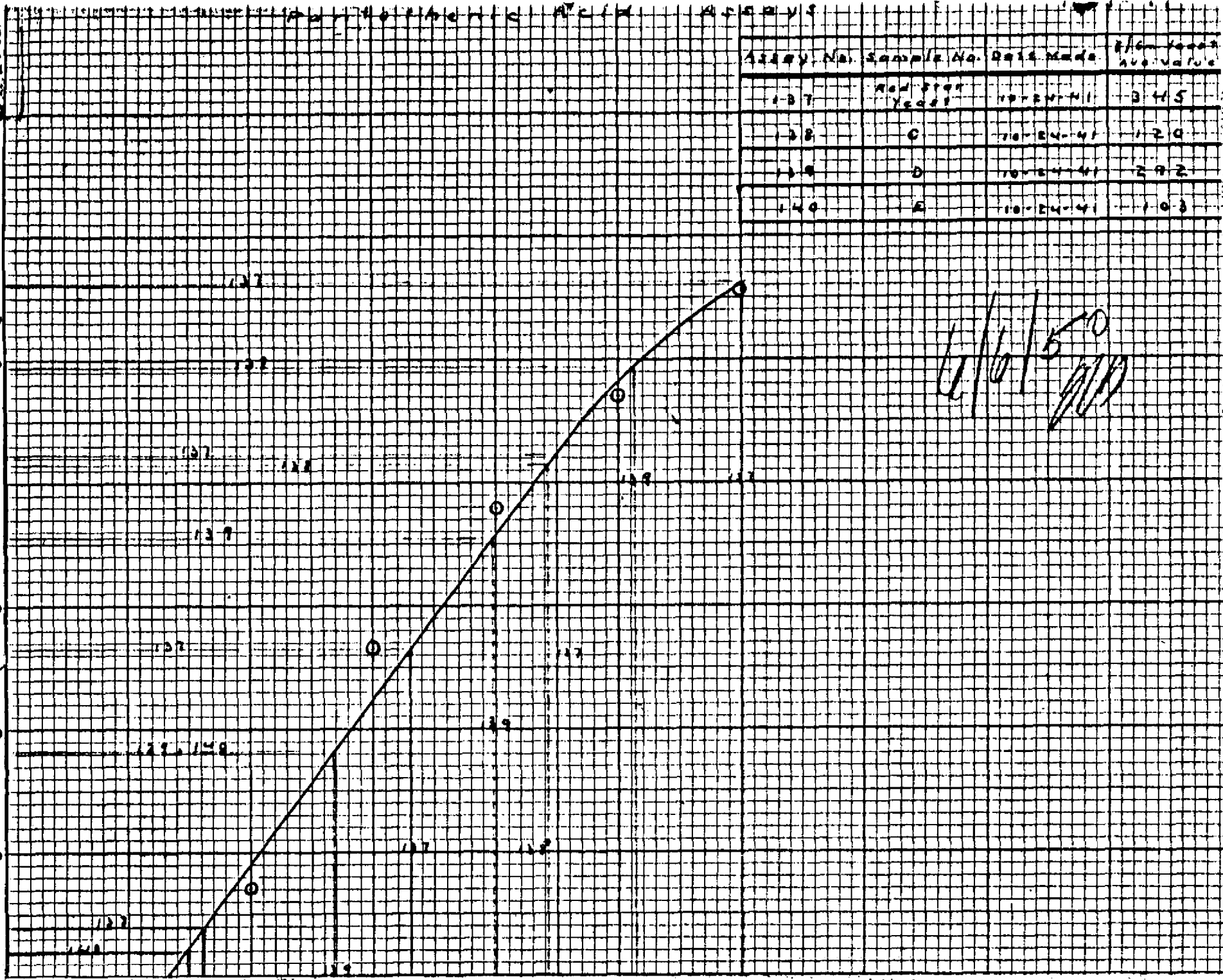
Comment:

ml. of N₂ Nooh



Ca Pantothenate / micrograms / 10 ml. media

1000000



Sample No.	Sample No.	Date Made	Avg. Value
137	Red Spot	10-24-41	3.45
138	C	10-24-41	1.20
139	D	10-24-41	2.92
140	E	10-24-41	1.03

6/6/50
JLD

11/3/41

Standard Curve Data for Pantothenic Acid

Assays Nos. 137, 138, 139, 140.

6/6/50
JW

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	25.72	26.82	1.10	
2	0.000	0.00	26.82	27.82	1.00	1.05
3	0.025	0.50	27.82	29.74	1.92	
4	0.025	0.50	29.74	31.76	2.02	1.97
5	0.050	1.00	31.76	35.36	3.60	
6	0.050	1.00	35.36	39.17	3.81	3.71
7	0.075	1.50	39.17	44.74	5.57	
8	0.075	1.50	0.00	5.73	5.73	5.65
9	0.100	2.00	5.73	12.38	6.65	
10	0.100	2.00	12.38	19.28	6.90	6.78
11	0.125	2.50	19.28	26.92	7.64	
12	0.125	2.50	26.92	34.67	7.75	7.70
13	0.150	3.00	34.67	43.18	8.51	
14	0.150	3.00	0.00	8.61	8.61	8.56

10/24/41

6/6/50
JPD

Pantothenic Acid Assay No. 137

Gms. Sample 1.0000

Dilution 1 gm. \rightarrow 250 ml. $\xrightarrow{10 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	0.20	0.50	8.61	14.27	5.66				345
2	0.20	0.50	14.27	19.88	5.61	5.64	0.082	4100	
3	0.40	1.00	19.88	27.11	7.23				
4	0.40	1.00	27.11	34.33	7.22	7.23	0.112	280	
5	0.60	1.50	34.33	42.89	8.66				
6	0.60	1.50	42.89	51.47	8.58	8.62	0.150	out 250	

Comment: Red Star Yeast (as originally used in the fermentation) just dried for assay.

Pantothenic Acid Assay No. 138

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 10 ml. → 10 ml.

10/24/51
6/6/50
JED

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	0.20	0.50	1.47	4.00	2.53				120
2	0.20	0.50	4.00	6.51	2.51	2.52	0.024	120	
3	0.40	1.00	6.51	9.71	3.40				
4	0.40	1.00	9.71	13.08	3.37	3.39	0.040	100	
5	0.80	2.00	13.08	20.32	7.24				
6	0.80	2.00	20.32	27.40	7.08	7.16	0.110	139	

Comment: Fermentation (C) - 4° Brix to start - fed 50° Bx - kept at 5:00 PM with NH_4OH .

10/24/51

6/6/50
JWB

Pantothenic Acid Assay No. 139

Qns. Sample 1.1100

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{10 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	0.20	0.50	27.40	32.12	4.72				
2	0.20	0.50	32.12	37.06	4.94	4.83	0.067	335	
3	0.40	1.00	37.06	43.65	6.59				
4	0.40	1.00	43.65	50.19	6.54	6.56	0.100	250	
5	0.60	1.50	0.19	7.73	7.54	7.95	0.128	214	
6	0.60	1.50	7.73	16.08	8.35				

292

Comment: Fermentation (10) - 18° Brine at start - constant 5.00 pH with NH_4OH .

Pantothemic Acid Assay No. 149

Gms. Sample 1.0000

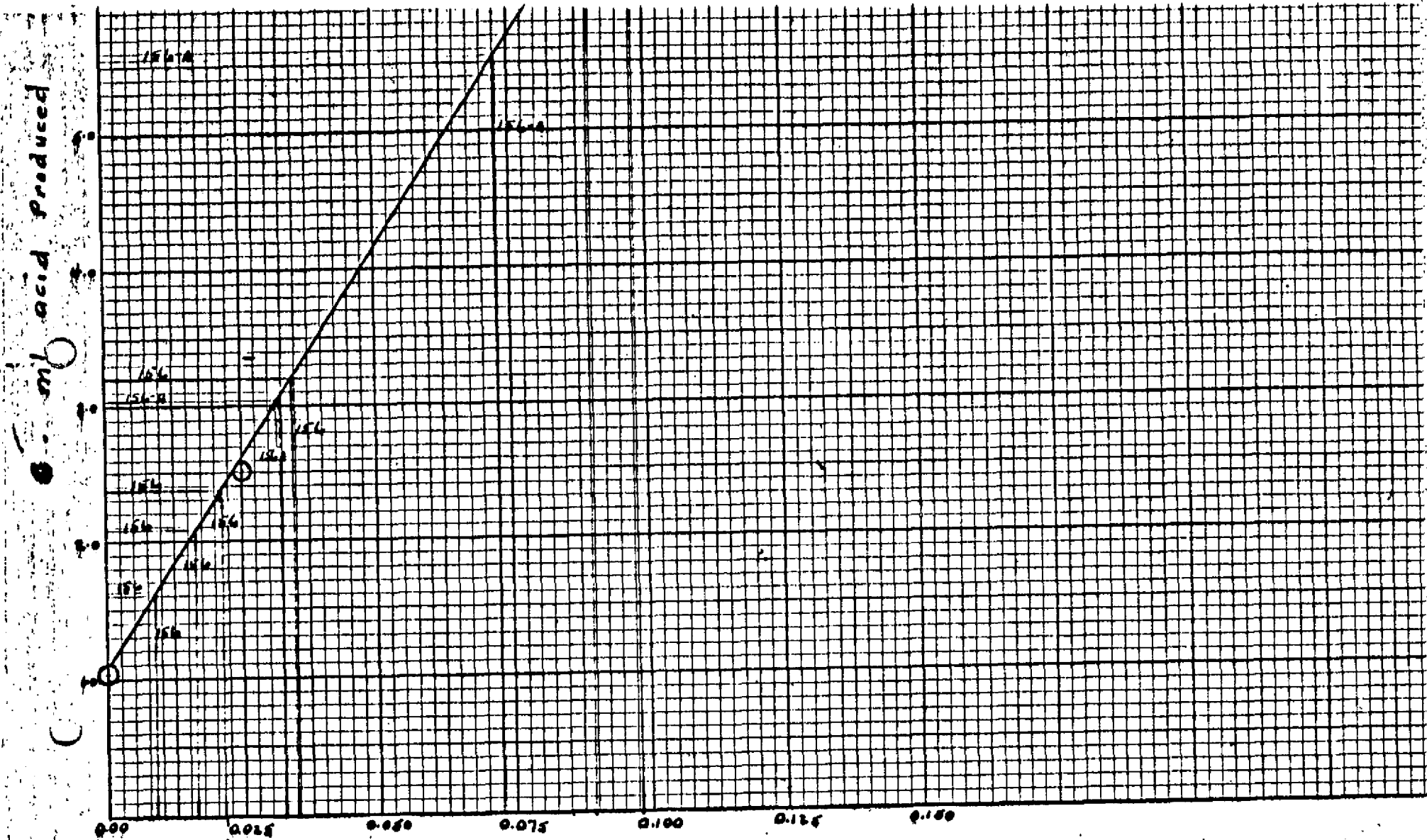
Dilution 1 gm. → 250 ml. → 10 ml. → 100 ml.

6/6/50
JPS

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothemic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms. / gm. yeast
1	0.20	0.50	16.08	18.47	2.39				
2	0.20	0.50	18.47	20.71	2.24	2.32	0.021	105	
3	0.40	1.00	20.71	24.10	3.39				
4	0.40	1.00	24.10	27.08	2.98	3.19	0.037	935	
5	0.60	1.50	27.08	32.00	4.92				
6	0.60	1.50	32.00	36.73	4.73	4.83	0.067	112.	

103

Comment: Fermentation (E) - 4° Bx to start - Fed 30° Bx - 7.77 H₂ 174

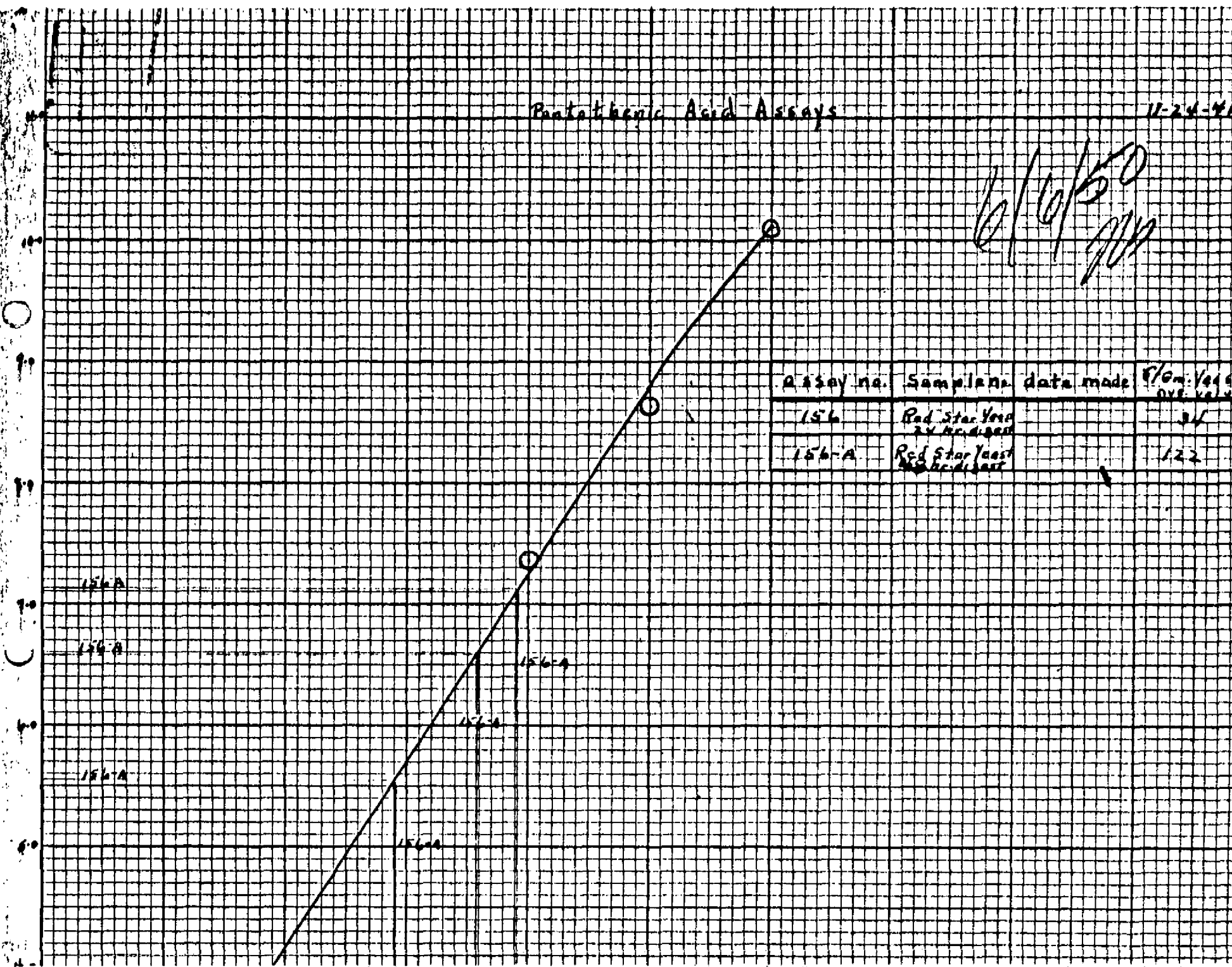
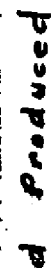


d-Calcium Pantothenate- micrograms/10ml media

Pantothenic Acid Assays

11-24-54

6/6/50
JLP



Assay no.	Sample no.	date made	flom. vol ox. vol
156	Red Star Yeast 24 hr. digest		31
156-A	Red Star Yeast 48 hr. digest		122

Atkins Norton
S.M.A. Corp.
Chapin, Falls
Ohio

Standard Curve Data for Pantothenic Acid

Assays Nos. 156, 156: A, and 157

6/6/50
JP

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	0.00	1.07	1.07	
2	0.000	0.00	1.07	2.08	1.01	1.04
3	0.025	2.50	2.08	4.57	2.49	
4	0.025	2.50	4.57	7.12	2.55	2.52
5	0.050	5.00	7.17	12.20	5.03	
6	0.050	5.00	12.20	17.28	5.08	5.06
7	0.075	3.00	17.28	23.88	6.60	
8	0.075	3.00	23.88	30.48	6.60	6.60
9	0.100	4.00	30.48	37.98	7.50	
10	0.100	4.00	37.98	45.22	7.24	7.37
11	0.125	5.00	0.01	8.57	8.57	
12	0.125	5.00	8.57	17.29	8.72	8.65
13	0.150	3.00	17.29	27.50	10.11	
14	0.150	3.00	27.50	37.58	10.08	10.10

10 → 100
25 → 250
10 → 100
25 → 100
10 → 100
25 → 50

6/6/50
JLP

Pantothenic Acid Assay No. 156 - A

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml. $\xrightarrow{25 \text{ ml.}}$ 1000 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1	0.25	1.00	8.64	11.56	2.92	3.01	0.032	128	122
	0.25	1.00	11.56	14.65	3.09				
2	0.50	2.00	14.65	20.18	5.53	5.54	0.073	146	
	0.50	2.00	20.18	25.82	5.54				
3	0.75	3.00	25.82	32.41	6.59	6.58	0.088	118.	
4	0.75	3.00	32.41	38.98	6.57				
5	1.00	4.00	38.98	46.02	7.04	7.11	0.097	97.0	
6	1.00	4.00	46.02	53.17	7.17				

Comment: Sample was yeast produced in plant since distillery started using Rt. Plan Yeast

On this Assay 48 hour (2 gm) Chloroform digestion was used.

P52

6/6/50
JW

Pantothenic Acid Assay No. 156

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 25 ml. → 200 ml. → 25 ml. → 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1	0.25	1.00	37.58	39.21	1.63	1.61	0.009	36	34
	0.25	1.00	39.21	40.80	1.59				
2	0.50	2.00	40.80	42.86	2.06	2.09	0.017	34	
	0.50	2.00	42.86	44.97	2.11				
3	0.75	3.00	44.97	47.48	2.51	2.38	0.022	29	
4	0.75	3.00	0.00	2.25	2.25				
5	1.00	4.00	2.25	5.52	3.27	3.20	0.035	35	
6	1.00	4.00	5.52	8.64	3.12				

Comment:

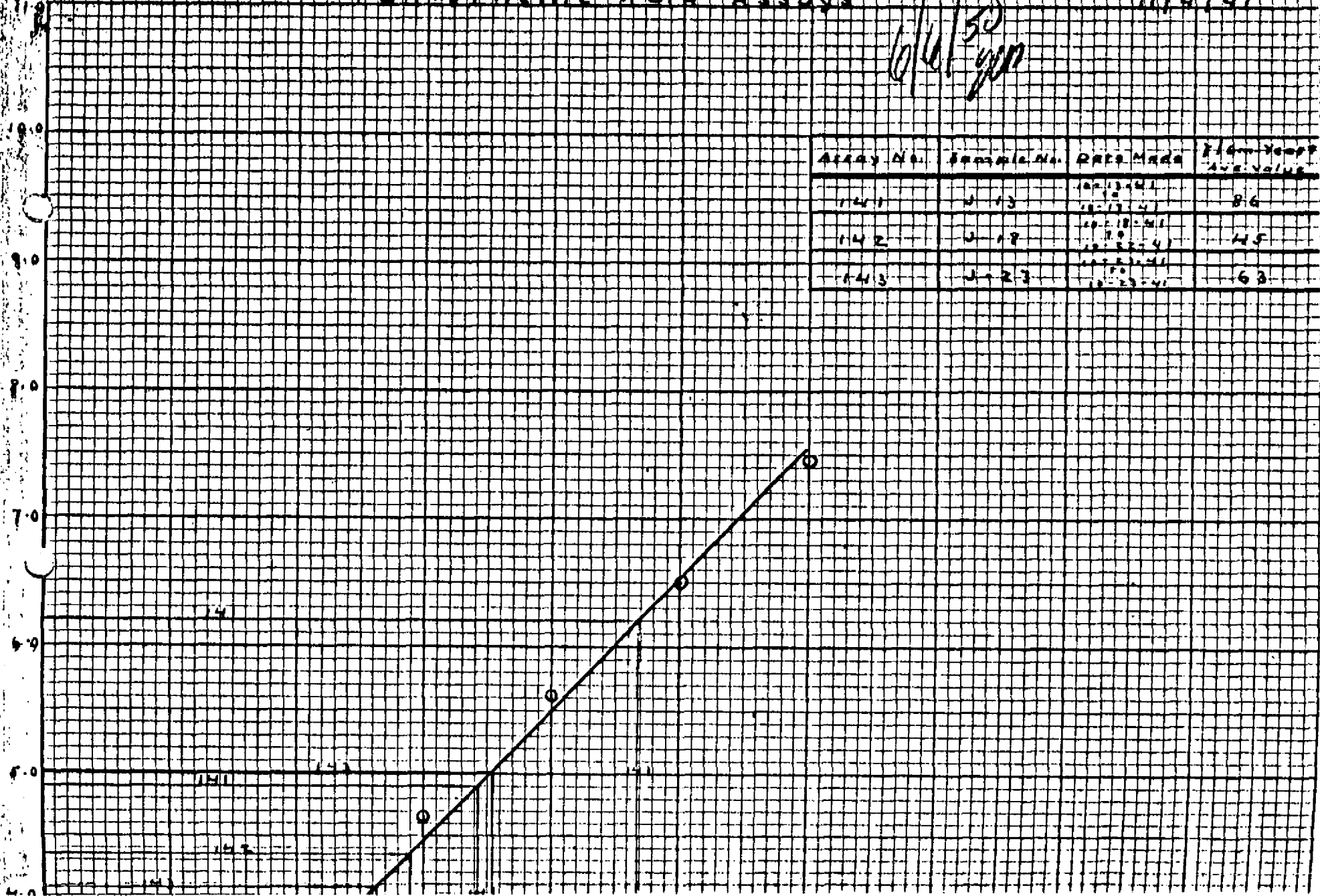
R21

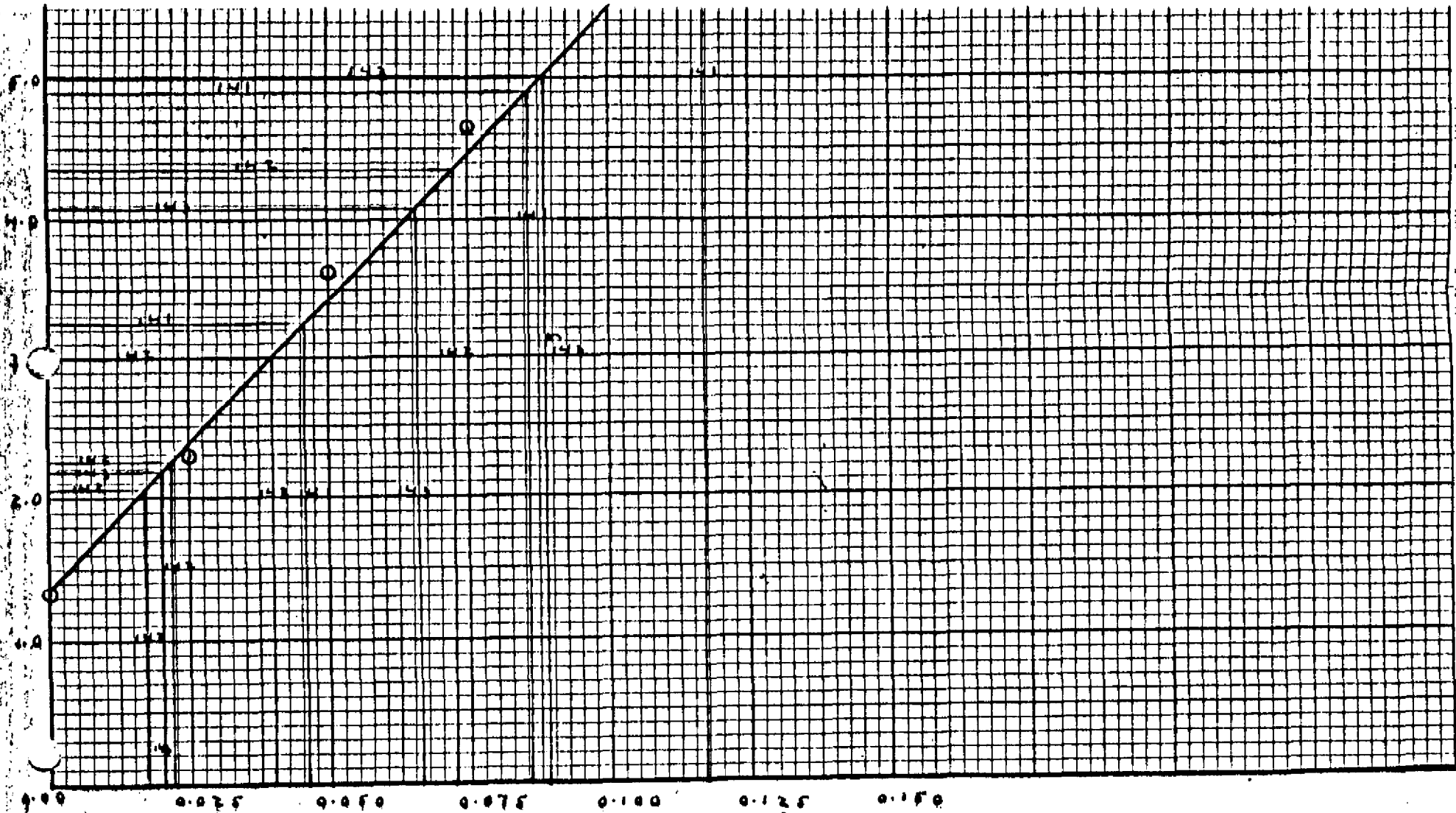
Pantothenic Acid Assays

6/6/50
gpr

11/4/51

Assay No.	Sample No.	Reps Made	16m Yravg Avg Value
141	J-13	10-13-41 10-17-41	86
142	J-18	10-18-41 10-22-41	45
143	J-23	10-23-41 10-29-41	63





Ca Pantothenate, micrograms / 10 ml. media

Standard Curve Data for Pantothemic Acid

Assays Nos. 141, 142, 143.

6/6/50
JWB

Tube No.	Synthetic Pantothemic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	20.77	22.07	1.30	
2	0.00	0.00	22.07	23.42	1.35	1.33
3	0.025	0.50	23.42	25.23	1.81	
4	0.025	0.50	25.23	27.52	2.29	2.29
5	0.050	1.00	27.52	31.29	3.77	
6	0.050	1.00	31.29	34.78	3.49	3.63
7	0.075	1.50	34.78	39.51	4.73	
8	0.075	1.50	39.51	44.07	4.56	4.65
9	0.100	2.00	0.00	5.30	5.30	
10	0.100	2.00	5.30	11.21	5.91	5.61
11	0.125	2.50	11.21	17.86	6.65	
12	0.125	2.50	17.86	24.20	6.34	6.50
13	0.150	3.00	24.20	31.57	7.37	
14	0.150	3.00	31.57	39.11	7.54	7.46

10/13/41 to 10/17/41

In duplicate

6/6/50
900

Pantothenic Acid Assay No. 141

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.50	0.50	39.11	42.49	3.38	3.25	0.046	92	86
2	0.50	0.50	42.49	45.60	3.11				
3	1.00	1.00	0.00	4.83	4.83	4.90	0.086	86	
4	1.00	1.00	4.83	9.80	4.98				
5	1.50	1.50	9.80	16.07	6.27	6.20	0.117	78	
6	1.50	1.50	16.07	22.19	6.12				

Comment: Sample No. J-13. Representing 5 days' production (from Oct. 13-17th incl. 1941)

10/18/41 to 10/22/41

Inclusive

6/6/50
YMD

Pantothenic Acid Assay No. 142

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantithenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. yeast	Avg. mcgms./gm. Yeast
1	0.50	0.50	23.19	24.25	2.06	2.06	0.017	34	45
2	0.50	0.75	24.25	26.50	2.25	2.25	0.022	30	
3	1.00	1.00	26.50	29.50	3.00	3.00	0.040	40	
4	1.00	1.00	29.50	29.60	—				
5	1.50	1.50	29.60	33.97	4.37	4.35	0.073	49	
6	1.50	1.50	33.97	38.29	4.32				

Comment: Sample No. 142 - Representing 5 days production from Oct. 18-22nd 1941

10/23/41 to 10/27/41

Inclusive.

6/6/50
Juo

Pantothemic Acid Assay No. 143

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{\quad}$ 250 ml. $\xrightarrow{\quad}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothemic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	0.50	0.50	38.29	40.33	2.04	2.17	0.020	out → 40	(63)
2	0.50	0.50	40.33	42.62	2.29				
3	1.00	1.00	42.62	46.76	4.14	4.07	0.066	66	
4	1.00	1.00	0.00	4.00	4.00				
5	1.50	1.50	4.00	9.07	5.07	5.01	0.088	59	
6	1.50	1.50	9.07	14.02	4.95				

Comment: Sample No. J-23. representing 5 days' production from Oct. 23-27th incl. 1941

NAME OF CONTRIBUTOR

Health Center

To Be Referred

Descript. No. 1

Frederick & Co.

File No. 65-13
List of Exhibits

File No. 65-4307-1

65-4307-1B-12(4)^{#15}

SAC, PHILADELPHIA

7/7/50

T. SCOTT MILLER, SA

HARRY GOLD, was.,
ESP - R

65-4307-1B 12 (4) Folder No. 14

On June 24, 1950 GOLD identified this material as work he did at Pennsylvania Sugar in connection with a book which GOLD was going to draw up for Dr. REICH and which was concerned with Pennsylvania Sugar Company methods.

GOLD also stated that this folder contained vitamin assay material in connection with GOLD's work at Pennsylvania Sugar.

65-4307-1B 12 (4) Folder No. 15

On the same date GOLD advised that all of the material in this folder was concerned with vitamin assay work he did at Pennsylvania Sugar.

TSM:ENC
65-4307

#15
6/10/50
200

Back
Assay Results

Initial

Final

Net

and

2976

3470

494

3470

3969

499

496

3969

4672

703

004

714

713

708

714

1734

1076

1734

2820

1336

1048

2820

3233

353

3233

3593

360

357

3593

4029

436

445

4029

4483

434

4483

5213

727

211

943

732

730

943

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1312

1664

352

361

1664

2097

434

434

2097

2531

433

2531

3236

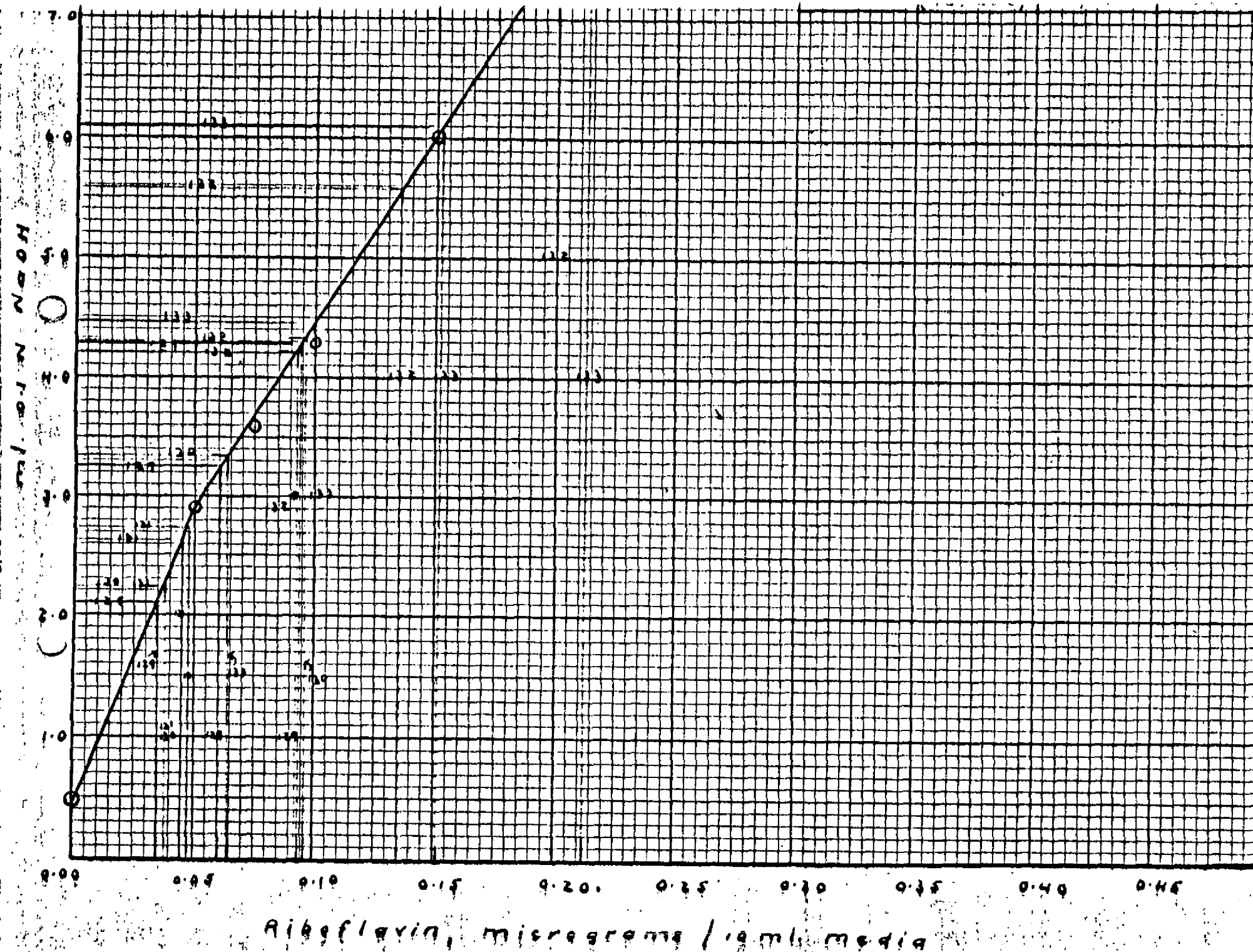
705

642

3236

3909

673

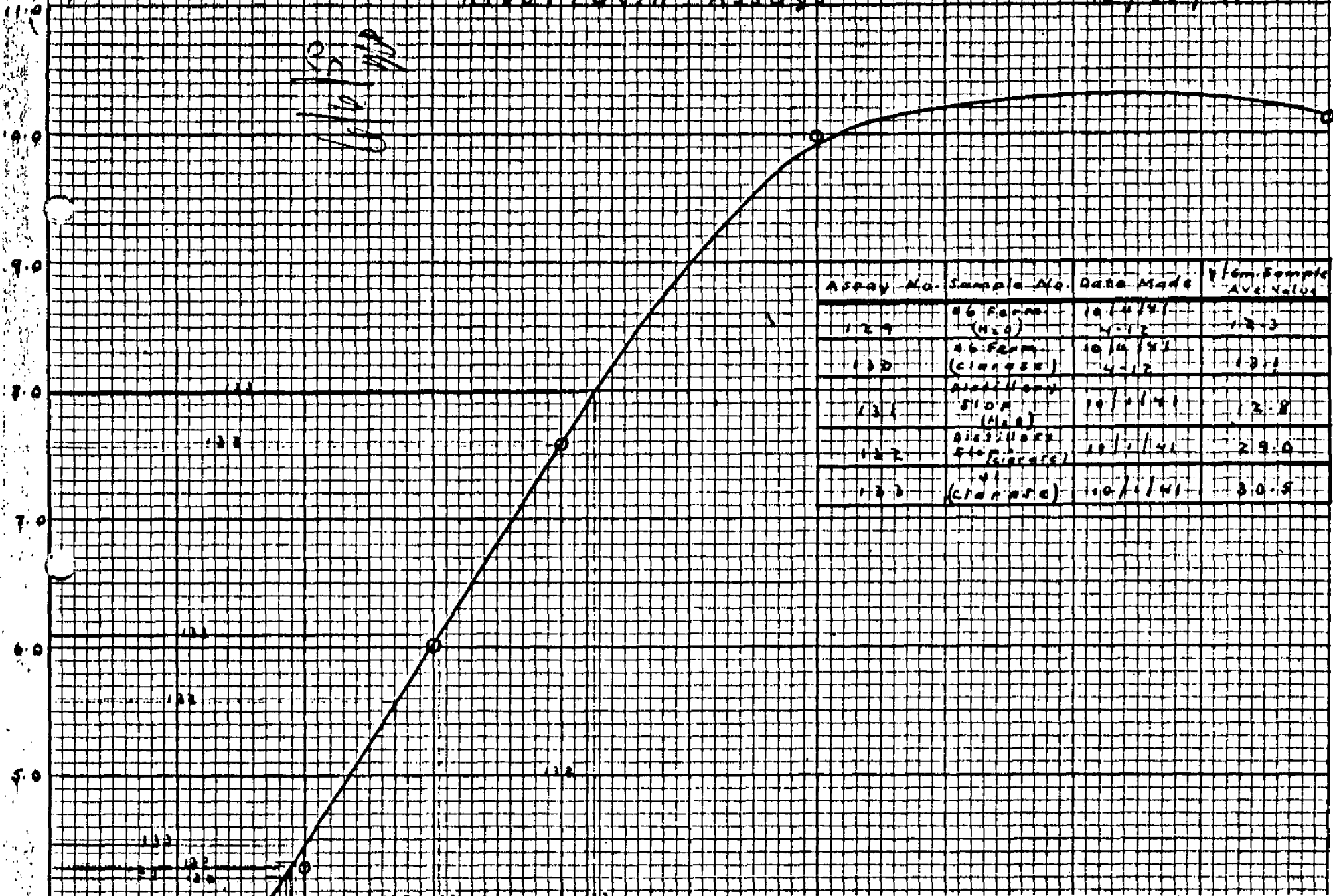


Riboflavin, micrograms / 10 ml media

Riboflavin Assays

10/22/41

10/22/41



Standard Curve Data for Riboflavin

Assays Nos. 129, 130, 131, 132, 133.

6/6/50
JUP

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	19.44	19.86	0.42	
2	0.00	0.00	19.86	20.39	0.53	0.48
3	0.05	0.50	20.39	23.30	2.91	
4	0.05	0.50	23.30	26.21	2.91	2.91
5	0.075	0.75	26.21	29.88	3.67	
6	0.075	0.75	29.88	33.36	3.48	3.58
7	0.10	1.00	33.36	37.75	4.39	
8	0.10	1.00	37.75	41.92	4.17	4.29
9	0.15	1.50	41.92	47.72	5.80	
10	0.15	1.50	0.06	6.27	6.21	6.01
11	0.20	2.00	6.27	13.83	7.56	
12	0.20	2.00	13.83	21.40	7.57	7.57
13	0.30	3.00	21.40	31.39	9.99	9.99
14	0.50	5.00	31.39	41.50	10.11	10.11

6/6/50
JPD

Riboflavin Assay No. 729

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. Yeast	Avg. mcgms/ gm. Yeast
1	3.0	1.50	41.50	43.42	1.92	2.10	0.035	11.7	12.3
2	3.0	1.50	43.42	45.64	2.22				
3	5.0	2.50	45.64	49.16	3.52	3.25	0.060	12.0	
4	5.0	2.50	0.00	2.97	2.97				
5	7.0	3.50	2.97	7.03	4.05	4.28	0.094	13.3	
6	7.0	3.50	7.02	11.53	4.51				

Comment:

4/6/50
JUB

Riboflavin Assay No. 130

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	3.0	1.50	11.53	13.77	2.24	2.24	0.038	12.7	13.1
2	3.0	1.50	13.77	16.00	2.23				
3	5.0	2.50	16.13	19.60	3.47	3.34	0.064	12.8	
4	5.0	2.50	19.60	22.81	3.21				
5	7.0	3.50	22.81	27.40	4.59	4.33	0.096	13.7	
6	7.0	3.50	27.40	31.46	4.06				

Comment:

date made 10/1/41

6/6/50
JTB

Riboflavin Assay No. 131

Gms. Sample 4.837 gms. weighed = 0.991 gms. dry solids

Dilution 0.991 gm. \rightarrow 25 ml. $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	Slop Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. slop	Avg. mgms. / gm. slop
1	2.97	1.50	31.46	33.48	2.02	2.24	0.038	12.8	(12.8)
2	2.97	1.50	33.48	34.93	2.45				
3	4.96	2.50	34.93	37.58	2.65	2.74	0.048	9.7	
4	4.96	2.50	37.58	40.40	2.82				
5	6.94	3.50	40.40	42.98	2.48	2.64	0.045	6.5	
6	6.94	3.50	42.98	45.81	2.83				

Comments:

Drying solids on slop = 3.99 %

25.755 gms. dish + slop

15.397 gms. dish + VI

10.358 gms. slop (wet)

15.819 gms. dish + slop

15.397 gms. dish + VI

0.413 gms. slop (dry)

6/6/50
PB

Riboflavin Assay No. 132

Gms. Sample \approx 0.837 gms. weighed = 0.991 gms. dry solids

Dilution 0.991 gms. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	S / o P Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. S / o P	Avg. mgms / gm. S / o P
1	2.97	1.50	45.81	49.83	4.02	4.21	0.092	30.9	(29.0)
2	2.97	1.50	0.00	4.40	4.40				
3	4.96	2.50	4.60	10.12	5.52	5.57	0.136	27.3	
4	4.96	2.50	10.33	15.94	5.61				
5	6.94	3.50	15.94	23.28	7.34	7.56	0.290	28.9	
6	6.94	3.50	23.28	31.05	7.77				

Comment:

Riboflavin Assay No. 133

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

6/6/50
gno

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	3.0	1.50	31.20	35.22	4.02	4.45	0.105	35.0	30.5
2	3.0	1.50	35.22	40.10	4.88				
3	5.0	2.50	40.10	46.13	6.03	6.09	0.152	30.4	
4	5.0	2.50	0.00	6.14	6.14				
5	7.0	3.50	6.14	14.11	7.97	7.98	0.213	30.5	
6	7.0	3.50	14.11	22.09	7.98				

Comment:

These assays include all set of 12 samples and a re-run of the yeast made in our plant on 9/30/47.

This last sample was run in duplicate digestion with

water

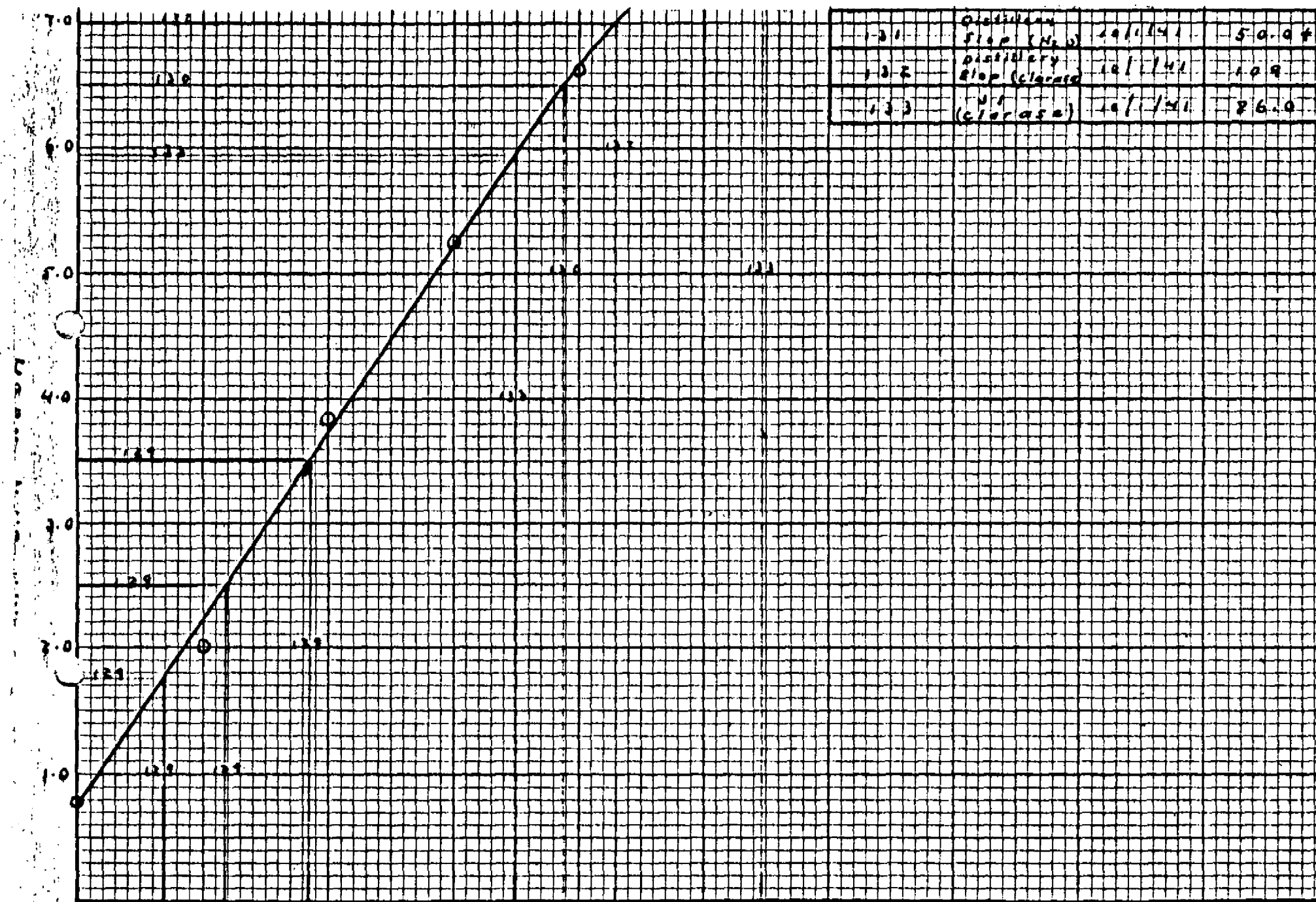
6/6/50
pro

2. charcoal

The idea was to see if more complete extraction of the vitamins could be obtained with the enzyme. The results of the original and re-run assays are

Sample	Date	Riboflavin	Pantothenic
original (H ₂ O)	10/7	10.2	15.7
re-run (H ₂ O)	10/14	9.0	17.6
re-run (charcoal)	10/14	20.0	50.0 +

These figures show that we are reporting at least the minimum amounts of riboflavin and pantothenic acid. After we have made a few more assays, we will know whether digestion with these assays is necessary at least on certain samples.



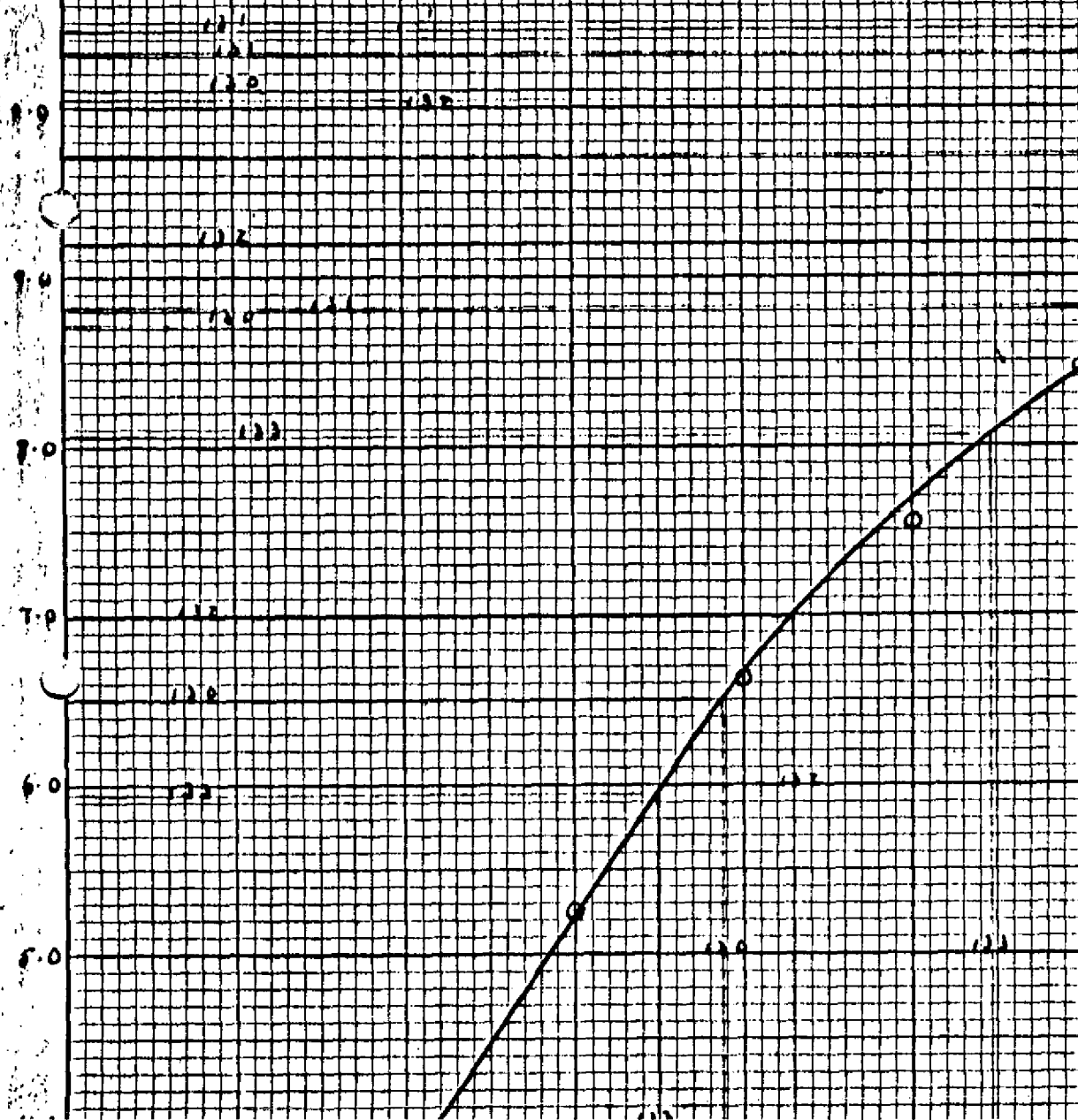
131	Distillation	29/1/41	50.94
132	Distillation	10/1/41	109
133	Distillation	10/1/41	26.0

0.00 0.025 0.050 0.075 0.100 0.125 0.150

Calcium Pantothenate, micrograms / 10 ml media

Pantothenic Acid Assays

10/22/41



Assay No.	Sample No.	Date Made	g/gm Sample Ave. Value
129	96 Pasm. (H ₂ O)	10/11/41	6.1
130	46 Pasm. (Clarase)	10/11/41	96.0
131	Distillery Slap (H ₂ O)	10/11/41	50.04
132	Distillery Slap (Clarase)	10/11/41	10.9
133	46 (Clarase)	10/11/41	26.0

66/50
200

3/1/77

Standard Curve Data for Pantothenic Acid

Assays Nos. 129, 130, 131, 132, 133

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	0.06	0.84	0.78	
2	0.000	0.00	0.84	1.64	0.80	0.79
3	0.025	0.25	1.64	4.62	Extra drop 2.98	out
4	0.025	0.25	4.62	6.63	2.01	2.01
5	0.050	0.50	6.63	10.35	3.72	
6	0.050	0.50	10.35	14.30	3.95	3.84
7	0.075	0.75	14.30	19.43	5.13	
8	0.075	0.75	19.43	24.80	5.37	5.25
9	0.100	1.00	24.80	31.38	6.58	
10	0.100	1.00	31.38	38.04	6.66	6.62
11	0.125	1.25	38.09	45.71	7.62	
12	0.125	1.25	0.02	7.44	7.42	7.52
13	0.150	1.50	7.44	15.77	8.33	
14	0.150	1.50	15.77	24.35	8.58	8.46

5/11/11

Pantothemic Acid Assay No. 129

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms/ gm. Yeast
1	3.0	1.50	24.35	26.03	1.68	1.75	0.017	5.7	6.1
2	3.0	1.50	26.03	27.85	1.82				
3	5.0	2.50	27.85	30.31	2.46	2.49	0.030	6.0	
4	5.0	2.50	30.31	32.83	2.52				
5	7.0	3.50	32.83	36.22	3.39	3.52	0.046	6.6	
6	7.0	3.50	36.22	39.86	3.64				

Comment: Mr. Stetson submitted sample #6 - Jan. 10-11-41 - (4th 12) - not just through pulverizer - sample digested with H₂O.

5/16/50
W/12/50

Pantothenic Acid Assay No. 130

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{\quad}$ 250 ml. $\xrightarrow{\quad}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms/ gm. Yeast
1	1.0	0.50	39.86	46.38	6.52	6.50	0.096	96.0	96.0
2	1.0	0.50	0.14	6.62	6.48				
3	2.0	1.00	6.62	15.19	8.57	8.73	—	—	
4	2.0	1.00	15.19	24.18	8.99				
5	3.0	1.50	24.18	34.24	10.06	10.10	—	—	
6	3.0	1.50	34.24	44.37	10.13				

Comment: Mr. Stetson's Sample - #6 Fermenter - 10-11-41 - (4 to 12.) not
 put through pulverizer -
 Sample Digested with Clarase.

date made 10/1/41

6/16/50
5/7/7

Pantothenic Acid Assay No. 131

Gms. Sample 24.837 gms. weighed = 0.991 gms dry Solids.

Dilution 0.991 gm. \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

Tube No.	Slop Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mcgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. slop	Avg. mcgms. / gm. slop
1	2.97	1.50	0.40	9.14	8.74	7.82	—	—	50.0 ⁺
2	2.97	1.50	9.14	18.03	8.89		—	—	
3	4.96	2.50	18.08	28.67	10.59	10.46	—	—	
4	4.96	2.50	28.67	38.99	10.32		—	—	
5	6.94	3.50	38.13	49.36	10.24	10.32	—	—	
6	6.94	3.50	0.00	10.40	10.40		—	—	

Comment:

Drying solids on slop (see memo sheet for figures)
= 3.99 %.

Matter Kachela submitted sample of distilling slop - sample digested with N.O.

5/10/71
OK

Pantothenic Acid Assay No. 132

Gms. Sample 24.837 gms. weighed = 0.991 gms. dry Solids

Dilution 0.991 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	Slop Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. slop	Avg. mcgms./ gm. slop
1	0.99	0.50	11.02	17.97	6.95	6.99	0.108	109.0	109.0
2	0.99	0.50	17.97	24.99	7.02				
3	1.98	1.00	24.99	34.26	9.27	9.19	—	—	
4	1.98	1.00	34.26	43.36	9.10				
5	2.97	1.50	0.00	10.19	10.19	10.05	—	—	
6	2.97	1.50	10.19	20.10	9.91				

Comment: Walter Kachela submitted sample - distilling slop - Chlorase digested.

5/15/50
WJH

Pantothenic Acid Assay No. 133

Qns. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms./gm. yeast
1	1.0	0.50	20.10	25.97	5.87	5.94	0.086	86.0	86.0
2	1.0	0.50	25.97	31.98	6.01				
3	2.0	1.00	31.98	39.96	7.98	8.06	0.136	68.0	
4	2.0	1.00	39.96	48.10	8.14				
5	3.0	1.50	0.00	9.82	9.82	9.72	—	—	
6	3.0	1.50	9.82	19.44	9.62				

Comment: This is a check assay - (Clarose digested) - Sample J-1-

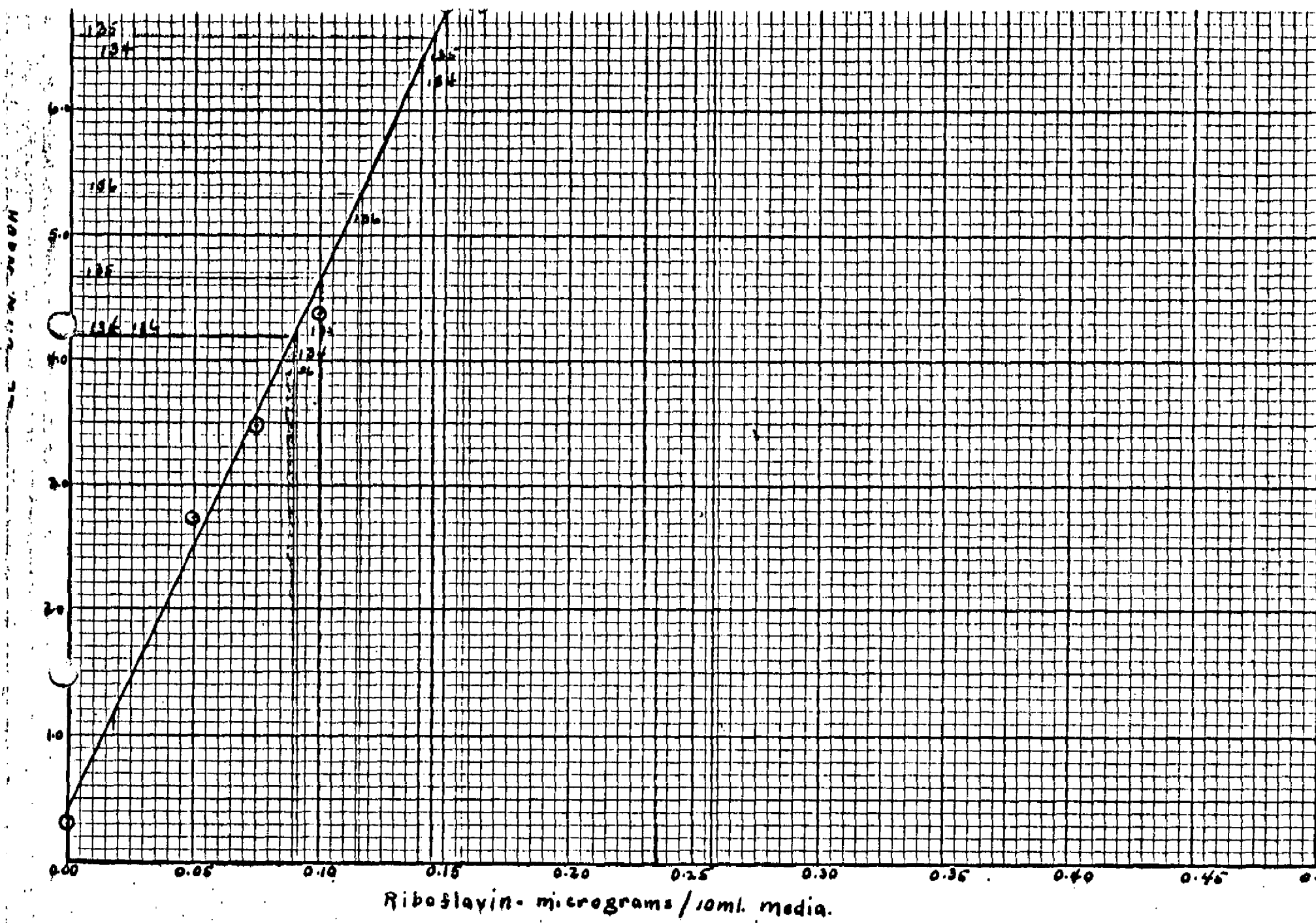
10/27/41

Doc

Please accept the Pantothenic Acid Assays
with strong reservations for the following reasons:-

- ① Possibility of unknown growth stimulants.
- ② Need for checks using aliquots more
within the range of our standard curves.

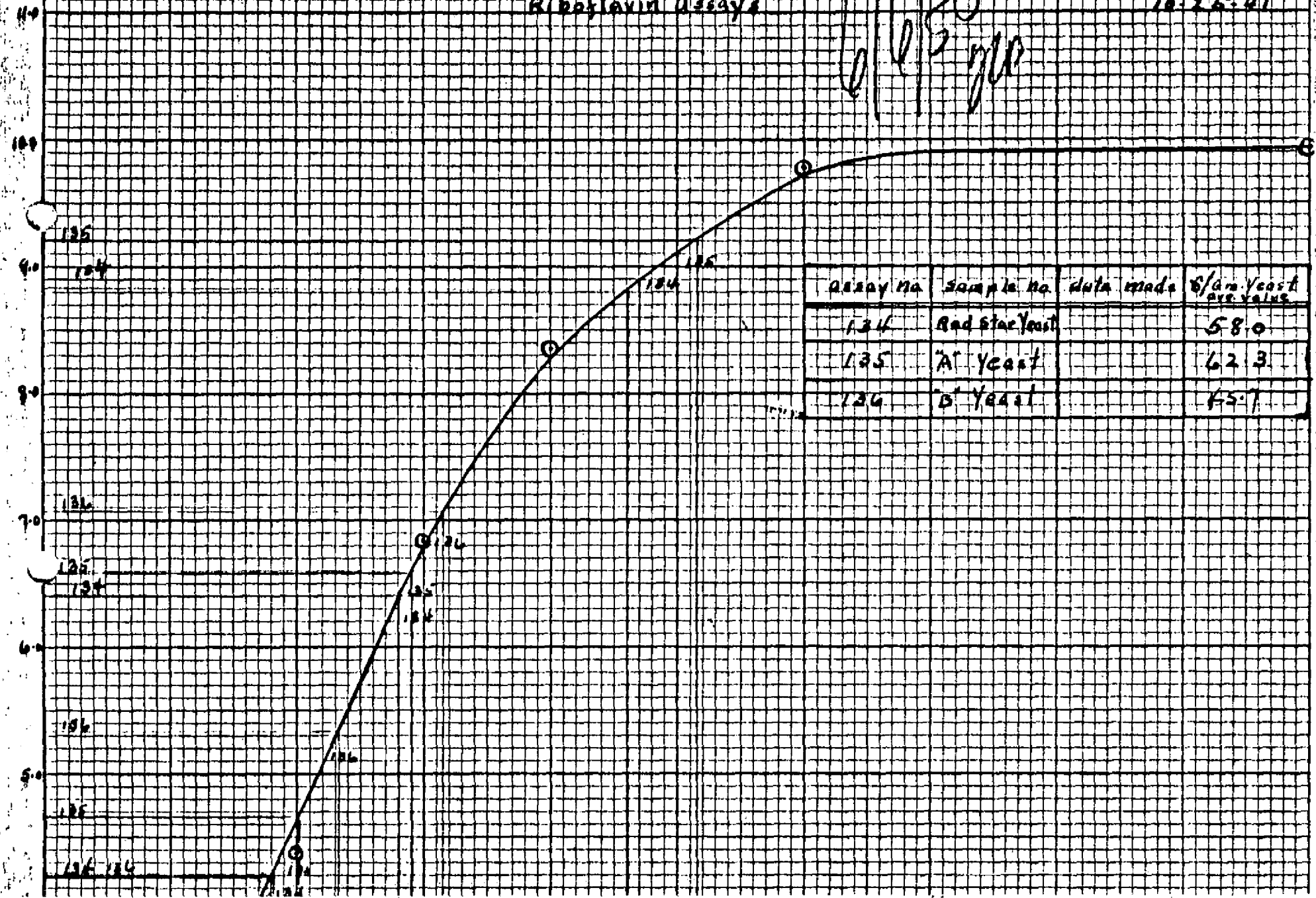
6/6/50 ms



Riboflavin Assays

10-25-41

6/6/5 gld



Standard Curve Data for Riboflavin

Assays Nos. 134, 135, 136.

6/6/50
200

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.28	0.60	0.32	
2	0.00	0.00	0.60	0.87	0.27	0.30
3	0.05	0.50	0.87	3.60	2.73	
4	0.05	0.50	3.60	6.41	2.81	2.77
5	0.075	0.75	6.41	9.89	3.48	
6	0.075	0.75	9.89	13.37	3.48	3.48
7	0.10	1.00	13.37	17.74	4.37	
8	0.10	1.00	17.74	21.13	3.39	4.37
9	0.15	1.50	21.13	27.96	6.83	
10	0.15	1.50	27.96	35.06	7.10	6.97
11	0.20	2.00	35.06	43.30	8.24	
12	0.20	2.00	0.00	8.43	8.43	8.34
13	0.30	3.00	8.43	18.21	9.78	9.78
14	0.50	5.00	18.21	28.13	9.92	9.92

Blank on charcoal 42.50 43.68 1.18

Riboflavin Assay No. 134

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{25 \text{ ml.}}$ 100 ml.

6/6/50
JB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	1.50	1.50	28.13	32.21	4.08				
2	1.50	1.50	32.21	36.50	4.29	4.19	0.090	59.9	
3	2.50	2.50	36.50	43.31	6.81				
4	2.50	2.50	43.31	49.32	6.01	6.41	0.140	56.0	
5	3.50	3.50	0.00	9.07	9.07				
6	3.50	3.50	9.07	17.82	8.75	8.91	0.236	67.4	
									(58.0)

Comment: original Red Star yeast; not dried for assay.

Riboflavin Assay No. 135

Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{25 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

6/6/50
700

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	1.50	1.50	17.82	23.63	4.81				
2	1.50	1.50	23.63	27.10	4.47	4.64	0.100	66.6	
3	2.50	2.50	27.10	33.98	6.88				
4	2.50	2.50	33.98	40.22	6.24	6.56	0.145	58.0	
5	3.50	3.50	40.22	49.23	9.01				
6	3.50	3.50	0.00	9.38	9.38	9.20	0.257	73.6	
									62.3

Comments:

start at 4.0 ml

Feed 50% AX

pH kept at 5.0 with NH₄OH

no aeration

6/6/50

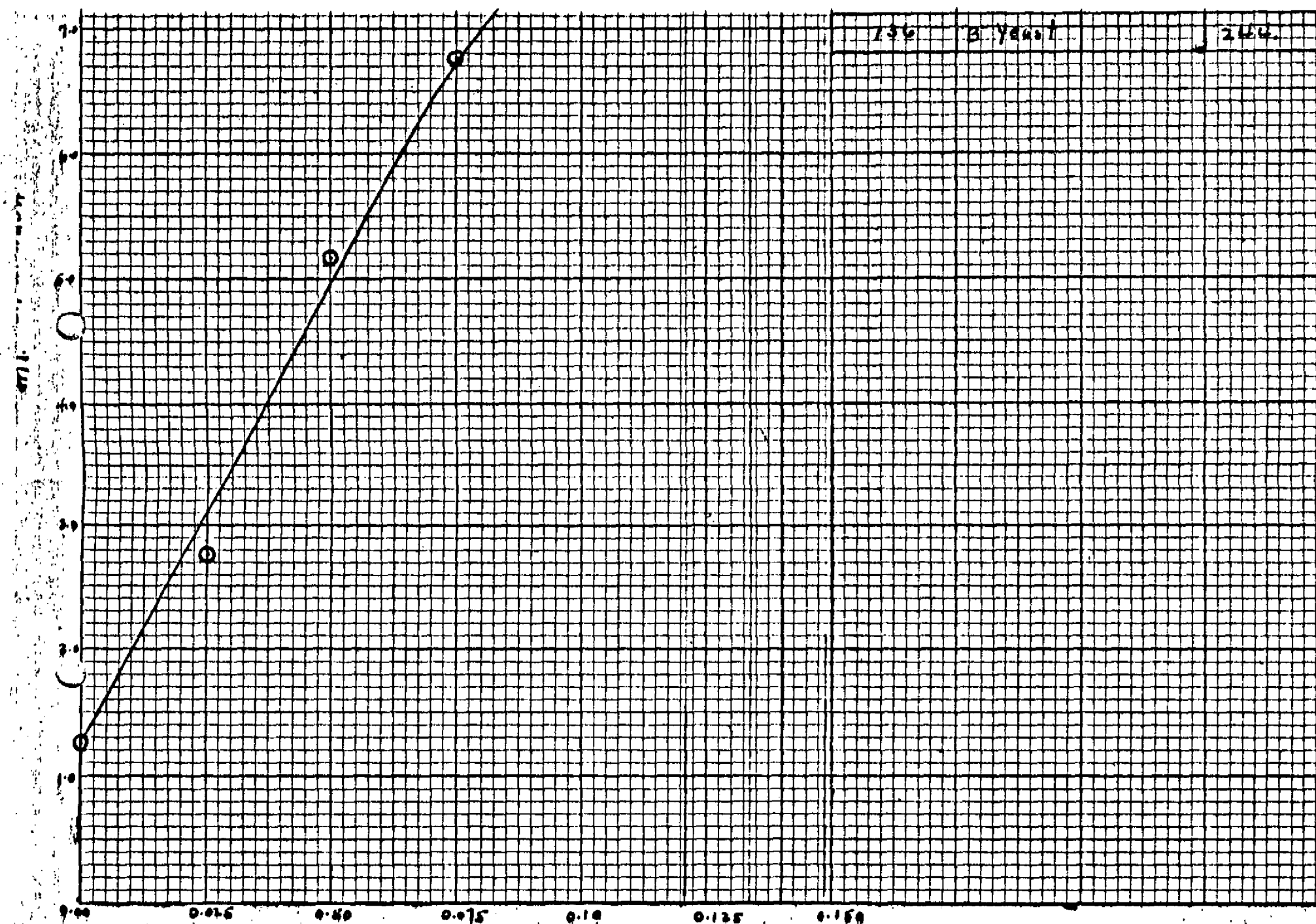
Riboflavin Assay No. 136

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 100 ml

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	1.50	1.50	9.38	13.68	4.30				
2	1.50	1.50	13.68	17.80	4.12	4.21	0.092	61.9	
3	2.50	2.50	17.80	23.18	5.38				
4	2.50	2.50	23.18	28.41	5.23	5.31	0.116	46.4	
5	3.50	3.50	28.41	35.30	6.89				
6	3.50	3.50	35.30	42.50	7.20	7.05	0.157	44.9	
									45.7

Comment: Start at 4.0 mix
 Feed 5.0 mix
 kept at 5.0 pH
Aeration

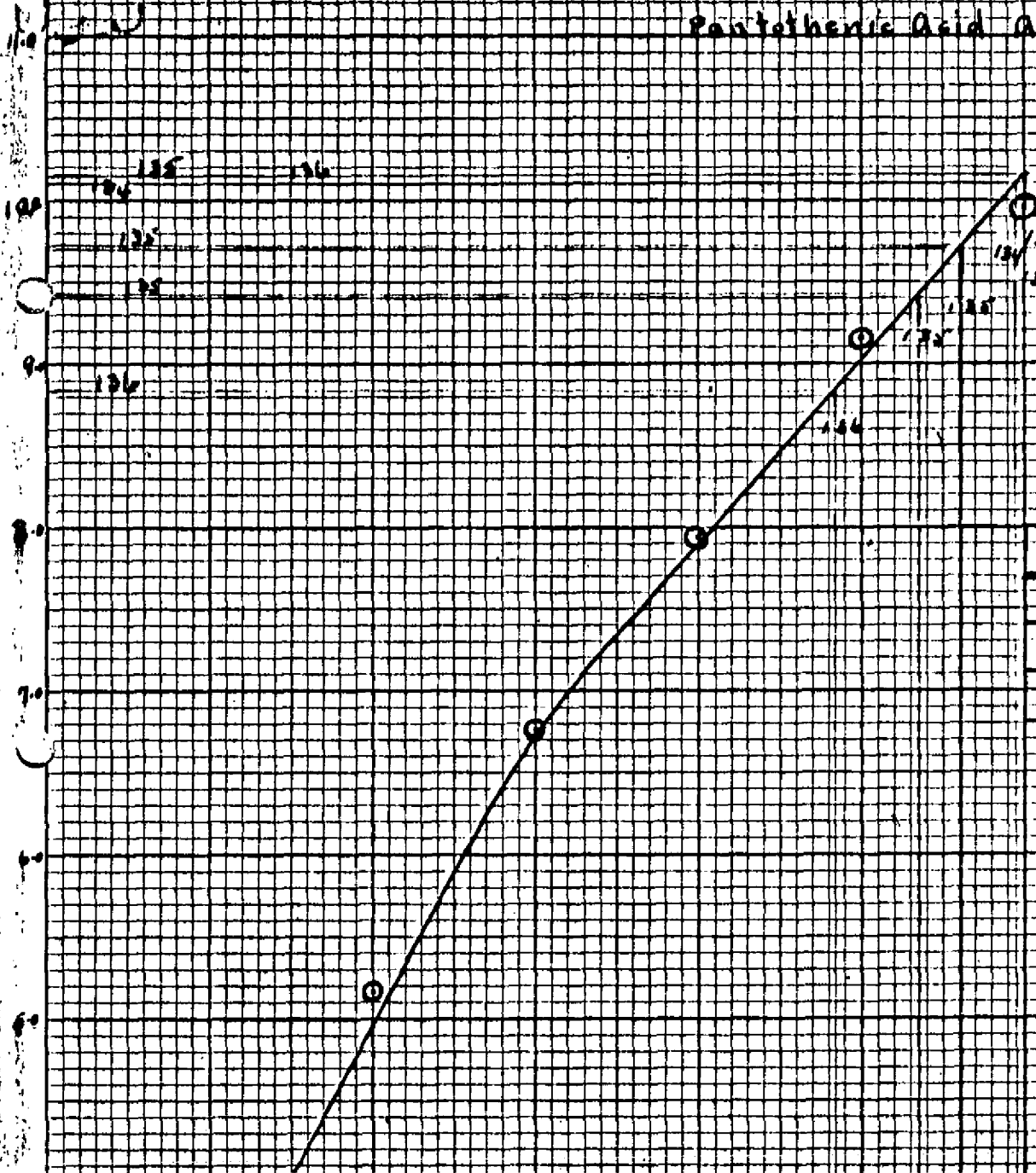


136 B Yeast 244

d-Calcium pantothenate - micrograms / 10 ml. media

Pantothenic Acid Assays

10-26-47



U/6/50
JMM

assay no.	sample no.	date made	g/m Yeast	arc value
124	Red Star Yeast		2.90	
135	"A" Yeast		2.66	
136	"B" Yeast		2.44	

Standard Curve Data for Pantothenic Acid

Assays Nos. 134, 135, 136

6/6/50
JMB

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.000	0.00	0.00	1.30	1.30	
2	0.000	0.00	1.30	2.51	1.21	1.26
3	0.025	0.50	2.51	5.20	2.69	
4	0.025	0.50	5.20	8.06	2.86	2.77
5	0.050	1.00	8.06	13.02	4.96	
6	0.050	1.00	13.02	18.40	5.38	5.17
7	0.075	1.50	18.40	25.07	6.67	
8	0.075	1.50	25.07	31.95	6.88	6.77
9	0.100	2.00	Extra 0.04 31.95	39.97	8.02	
10	0.100	2.00	39.97	47.82	7.85	7.94
11	0.125	2.50	0.00	9.16	9.16	
12	0.125	2.50	9.16	18.40	9.14	9.15
13	0.150	3.00	18.40	28.40	10.00	
14	0.150	3.00	28.40	38.35	9.95	9.97

Blank on Curve 30.38 32.30 1.92

Pantothenic Acid Assay No. 134

Qns. Sample 1.000 g.

Dilution 1 g. → 250 ml. → 25 ml. → 10.0 ml.

6/6/50
JUB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	0.50	0.50	38.35	48.45	10.05				
2	0.50	0.50	0.00	10.02	10.02	10.04	0.147	290	
3	1.00	1.00	10.02	20.12	10.11				
4	1.00	1.00	20.12	30.22	10.09	10.10	~	~	
5	1.50	1.50	30.22	40.30	10.08				
6	1.50	1.50	0.00	10.12	10.12	10.10	~	~	

290

approximately

Comment:

original Red Star yeast; not dried for assay.

41

Pantothenic Acid Assay No. 135
 Gms. Sample 1.0000
 Dilution 1:250

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
							magna. chart	magna. per gm. yeast	Avg. magna/ gm. yeast
	mgs.	ml.	Initial	Final	Individual	Average			
1	0.50	0.50	10.12	19.51	9.39				
					9.45	9.43	0.133	266	
2	0.50	0.50	19.51	28.96	9.39				
					10.05	9.72	0.140	140	
3	1.00	1.00	28.96	38.35					
					10.23		—	—	
4	1.00	1.00	38.35	48.40					
					10.03	10.13			
5	1.50	1.50	0.04	10.27					
			extra drop	20.30					
6	1.50	1.50	10.27						

Comments: 2 Cart at 4.0 pH
 Feed 5.0 pH
 pH kept at 5.0 with NH_4OH
no aeration.

266
 approxi-
 mately

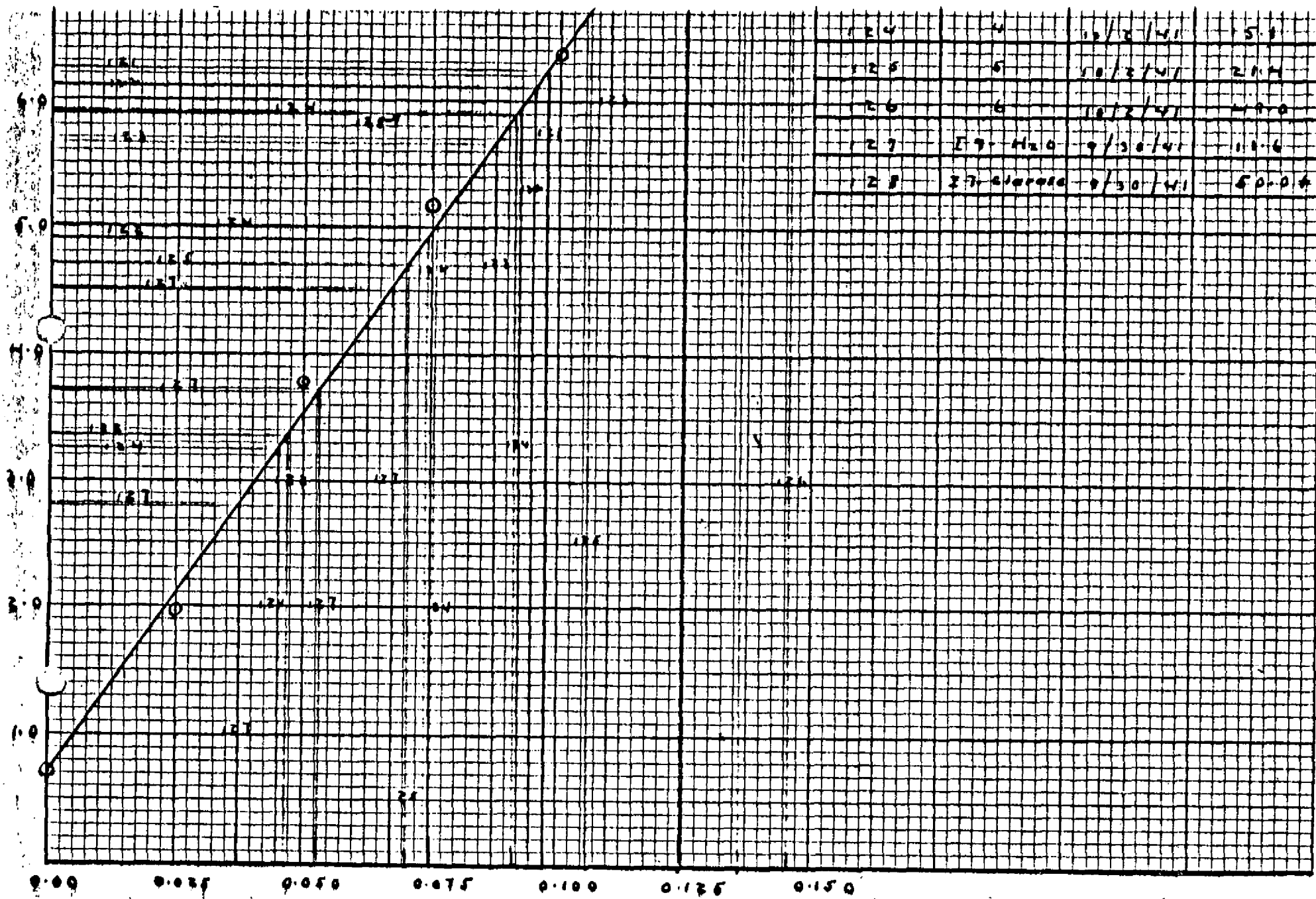
6/45

Pantothemic Acid Assay No. 136
 Gms. Sample 1.0000

Dilution 1 gm. $\xrightarrow{250 \text{ ml.}}$ $\xrightarrow{25 \text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothemic Acid		Found
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	
1	0.50	0.50	20.30	29.02	8.72	8.83	0.122	244	244
2	0.50	0.50	29.02	37.96	8.94				
3	1.00	1.00	37.96	47.88	9.92	10.03	—	—	
4	1.00	1.00	0.00	10.13	10.13				
5	1.50	1.50	10.13	20.32	10.19	10.13	—	—	
6	1.50	1.50	20.32	30.38	10.06				

Comment: start at 4.0 pH
 Feed 50.0 pH
 pH kept at 5.0 with NH_4OH
aeration

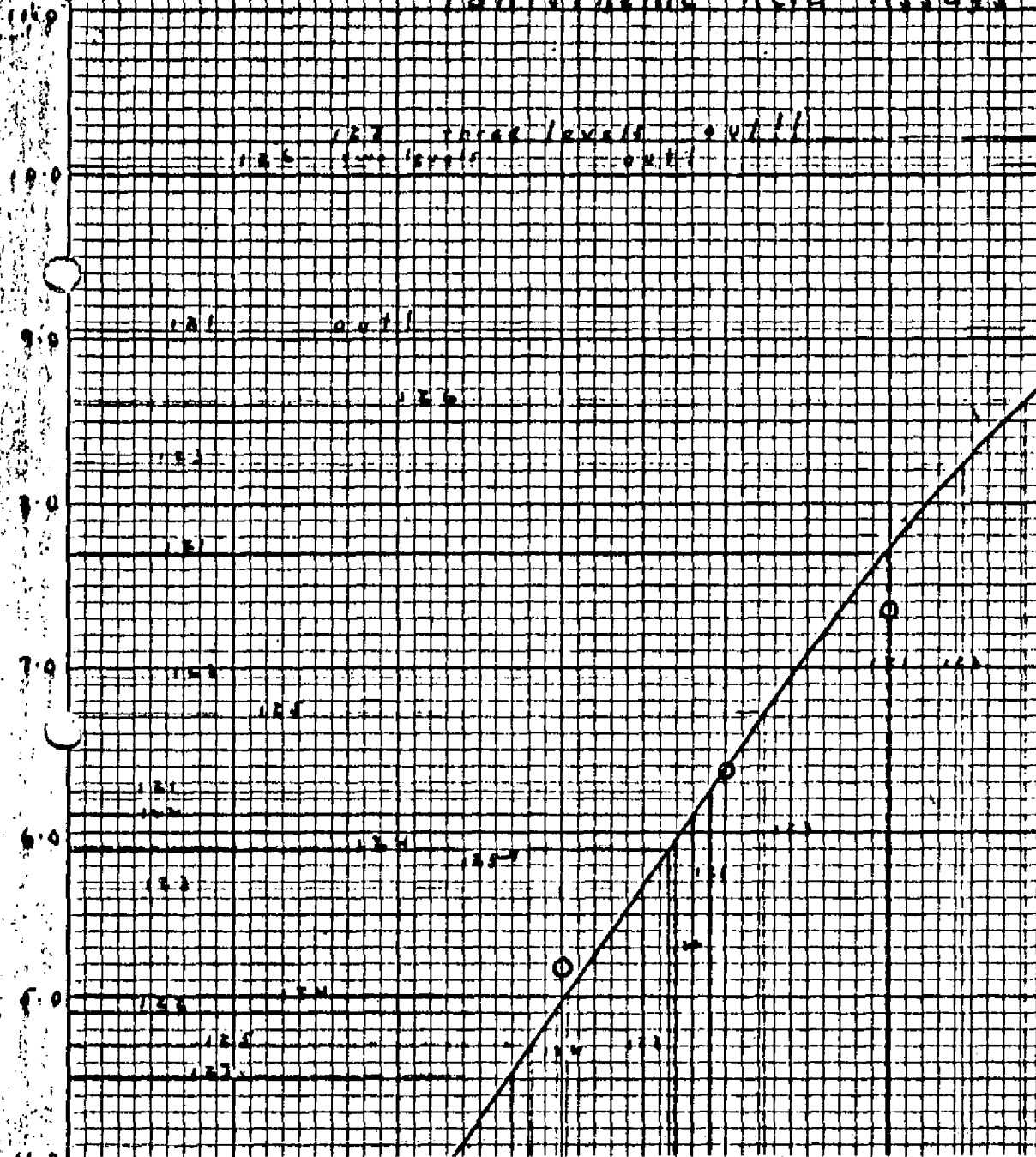


124	4	10/2/41	5.3
125	5	10/3/41	21.4
126	6	10/2/41	47.0
127	17.4	9/30/41	11.6
128	27.4	9/30/41	50.04

Calcium Pantothenate, micrograms / 10 ml media

Pantothenic Acid Assays

10/15/51



Assay No.	Sample No.	Date Made	1/20 - 1/200 Avg. Value
121	1	10/2/41	29.0
122	2	10/2/41	14.7
123	3	10/2/41	25.8
124	4	10/2/41	15.1
125	5	10/2/41	26.4
126	6	10/2/41	44.0
127	17 - H ₂ O	9/30/41	11.6
128	17 - closed	9/30/41	40.04

Notes

10-14-41

Standard Curve Data for Pantothenic Acid

Assays Nos. 121, 122, 123, 125, 126, 127, 128

6/6/50
JMD

Tube No.	Synthetic Pantothenic Acid		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	18.17	18.80	0.63	
2	0.00	0.00	18.80	19.59	0.79	0.71
3	0.025	0.25	19.59	20.52	1.93	
4	0.025	0.25	21.52	23.48	1.96	1.95
5	0.050	0.50	23.48	27.27	3.79	
6	0.050	0.50	27.27	31.03	3.76	3.78
7	0.075	0.75	31.03	36.28	5.25	
8	0.075	0.75	36.28	41.36	5.08	5.17
9	0.100	1.00	41.36	47.74	6.38	
10	0.100	1.00	0.03	6.37	6.34	6.36
11	0.125	1.25	6.37	13.74	7.37	
12	0.125	1.25	13.74	21.08	7.32	7.35
13	0.150	1.50	21.08	29.70	8.62	
14	0.150	1.50	29.70	38.69	8.99	8.81

Hatter

10-2-41

Pantothenic Acid Assay No. 121

Gms. Sample 1.4009

Dilution 1 \longrightarrow 254 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.6/6/50
JWB

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms/ gm.
1	3.0	1.50	38.69	45.01	6.32	6.24	0.098	32.7	29.0
2	3.0	1.50	0.00	6.16	6.16				
3	5.0	2.50	6.16	13.83	7.67	7.69	0.125	25.0	
4	5.0	2.50	13.83	21.53	7.70				
5	7.0	3.50	21.53	30.63	9.10	9.04	—	—	
6	7.0	3.50	30.63	39.60	8.97				

Comment: Fermentation was set with 5000 cc High test Molasses (diluted to 40 Bx 111) treated with a wgt. of $(\text{NH}_4)_2\text{SO}_4$ = to amt. of H_2SO_4 used in distillery - pasteurized - centrifuged - treated with NH_4OH to a pH of 5:00 - after dilution to 10 Bx $(\text{NH}_4)_2\text{SO}_4$ and Na_2HPO_4 were added as yeast foods.
(Red Star yeast was used to seed.)

10/2/41

6/6/50
JUP

Pantothenic Acid Assay No. 122

Gms. Sample 1.0000

Dilution 1 \longrightarrow 250 ml. $\xrightarrow{25\text{ ml.}}$ 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm. Yeast	Avg. mcgms/ gm. Yeast
1	3.0	1.50	39.60	42.95	3.35	3.36	0.47	15.6	14.7
2	3.0	1.50	42.95	46.31	3.36				
3	5.0	2.50	0.00	4.87	4.87	4.91	0.074	14.8	
4	5.0	2.50	4.87	9.82	4.95				
5	7.0	3.50	9.82	15.93	6.11	6.11	0.095	13.6	
6	7.0	3.50	15.93	21.18	5.25 ^{avg}				

Comment: 4500cc HT
500cc Sour Mash

Pentothemic Acid Assay No. 123

Gms. Sample 1.0000

Dilution 1 → 250 ml. → 25 ml. → 50 ml.

10/2/41
6/6/50
JPD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pentothemic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms/ gm. Yeast
1	3.0	1.50	21.18	27.61	^{over} 6.43	5.66	0.087	29.0	(25.5)
2	3.0	1.50	27.61	33.27	5.66				
3	5.0	2.50	33.27	40.24	6.97	6.94	0.110	22.0	
4	5.0	2.50	40.24	47.15	6.91				
5	7.0	3.50	0.00	8.27	8.27	8.24	0.136	^{over} 19.5	
6	7.0	3.50	8.27	16.47	8.20				

Comment: 2250 cc NT
500 cc Sour Mash
2250 cc Malt + Corn

Pantethenic Acid Assay No. 124

Gms. Sample 1.0000

Dilution 1 → 250 ml. 25 ml.

10/2/41

6/6/50
JPD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantethenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms/ gm.
1	3.0	1.50	16.47	19.79	3.32	3.25	0.045	15.0	(15.1)
2	3.0	1.50	19.79	22.97	3.18				
3	5.0	2.50	22.97	28.00	5.03	5.01	0.076	15.2	
4	5.0	2.50	28.00	32.99	4.99				
5	7.0	3.50	32.99	39.02	6.03	5.92	0.092	out 13.2	
6	7.0	3.50	39.02	44.83	5.81				

Comment:

500 cc Sour Mash
4500 cc Malt & Corn

Pantothemic Acid Assay No. 125

Gms. Sample 1.0000

Dilution 1 → 250 ml. → 25 ml. → 50 ml.

10/2/41
6/6/50
JMD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mcgms. chart	mcgms. per gm.	Avg. mcgms./gm.
1	3.0	1.50	0.00	4.76	4.76	4.72	0.070	23.3	21.4
2	3.0	1.50	4.76	9.44	4.68				
3	5.0	2.50	9.44	15.41	5.97	5.89	0.092	18.4	
4	5.0	2.50	15.41	21.31	5.80				
5	7.0	3.50	21.31	27.86	6.65	6.73	0.106	out 15.0	
6	7.0	3.50	27.86	34.67	6.81				

Comment: 5000 CC Malt + Corn.

Pantothemic Acid Assay No. 136

Gms. Sample 1.0000

Dilution 1 → 2.50 ml. → 25 ml. → 50 ml.

10/2/41
6/6/50
700

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothemic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm.	Avg. mgms./gm.
1	3.0	1.50	34.67	43.17	8.50	8.63	0.147	49.0	49.0
2	3.0	1.50	43.17	51.92	8.75				
3	5.0	2.50	1.92	12.00	10.08	10.03	—	—	
4	5.0	2.50	12.00	21.93	9.97				
5	7.0	3.50	21.93	32.11	10.18	10.06	—	—	
6	7.0	3.50	32.11	42.05	9.94				

Comment: Original Red Star Yeast used as seed in attached Fermentation

9/20/41

6/6/50
JW

Pantothenic Acid Assay No. 127

Gms. Sample 1.0400

Dilution 1 → 250 ml. → 25 ml. → 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms/ gm. Yeast
1	3.0	1.50	42.05	44.98	2.93	2.83	0.037	12.7	11.6
2	3.0	1.50	44.98	47.71	2.73				
3	5.0	2.50	0.00	3.66	3.66	3.73	0.053	10.6	
4	5.0	2.50	3.66	7.45	3.79				
5	7.0	3.50	7.45	11.93	4.48	4.53	0.066	9.4	
6	7.0	3.50	11.93	16.51	4.58				

Comments:

9/20/41

6/6/50
200

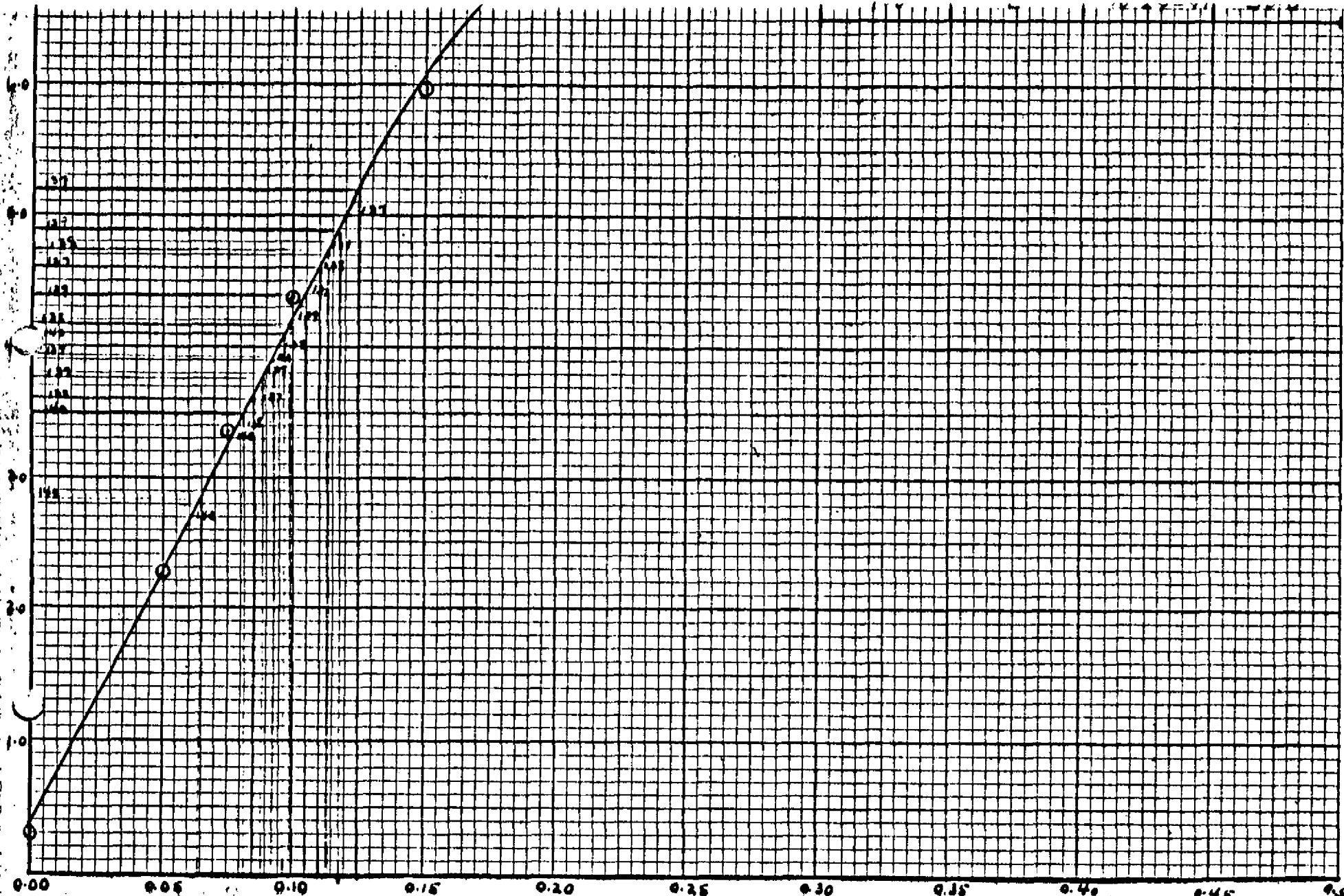
Pantothenic Acid Assay No. 128

Gms. Sample 1.0049

Dilution 1 → 250 ml. 25 ml. 50 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Pantothenic Acid Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. Yeast	Avg. mgms. / gm. Yeast
1	3.0	1.50	16.51	26.58	10.07	10.15	—	—	50+
2	3.0	1.50	26.58	36.80	10.22		—	—	
3	5.0	2.50	37.00	47.06	10.06	10.22	—	—	
4	5.0	2.50	0.34	10.72	10.38		—	—	
5	7.0	3.50	10.72	20.96	10.24	10.21	—	—	
6	7.0	3.50	20.96	31.14	10.18		—	—	

Comment:

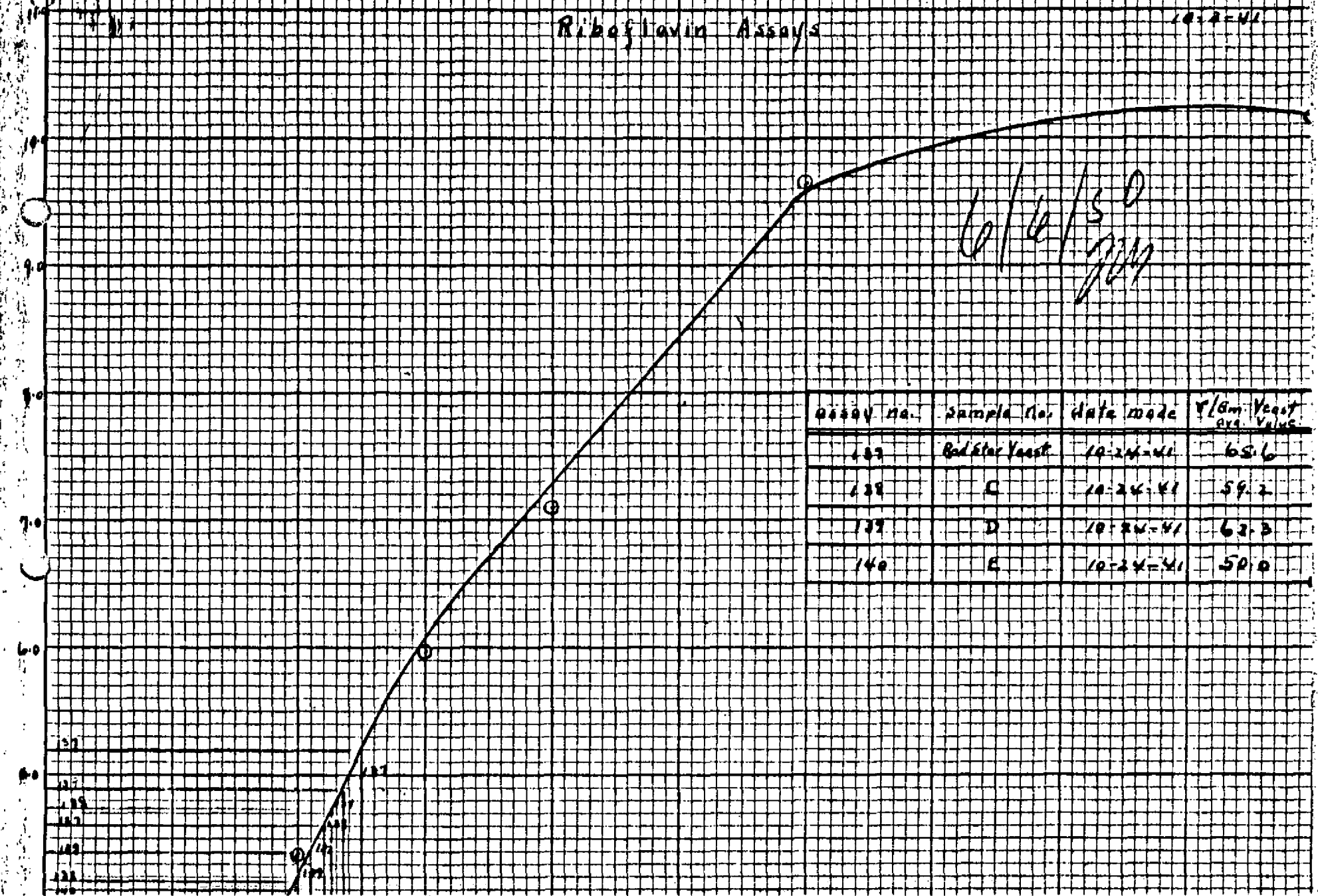


Riboflavin, micrograms / 10 ml. media

Riboflavin Assays

10-24-41

6/6/50
JPM



Assay No.	Sample No.	Date made	Y/am Yeast Avg. Value
137	Red Star Yeast	10-24-41	65.6
138	C	10-24-41	59.2
139	D	10-24-41	63.3
140	E	10-24-41	50.0

Standard Curve Data for Riboflavin

Assays Nos. 137, 138, 139, 140.

6/6/50
JW

Tube No.	Synthetic Riboflavin		Buret Readings, ml.		ml. of 0.1 N NaOH	
	mcgms.	ml.	Initial	Final	Individual	Average
1	0.00	0.00	0.12	0.43	0.31	
2	0.00	0.00	0.43	0.73	0.30	0.31
3	0.05	0.50	0.73	3.84	3.11	
4	0.05	0.50	3.84	6.10	2.26	2.26
5	0.075	0.75	6.10	9.56	3.46	
6	0.075	0.75	9.56	12.99	3.43	3.45
7	0.10	1.00	12.99	17.27	4.28	
8	0.10	1.00	17.27	21.69	4.42	4.35
9	0.15	1.50	21.69	27.51	5.82	
10	0.15	1.50	27.51	33.60	6.09	5.96
11	0.20	2.00	33.60	40.68	7.08	
12	0.20	2.00	40.68	47.80	7.12	7.10
13	0.30	3.00	0.00	9.64	9.64	
14	0.50	5.00	9.64	19.81	10.17	9.91

Riboflavin Assay No. 137

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 $\xrightarrow{10 \text{ ml.}}$ 100 ml.

6/6/50
JMD

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	1.20	3.00	19.81	23.60	3.79			out	65.6
2	1.20	3.00	23.60	27.33	3.73	3.76	0.088	73.3	
3	1.60	4.00	27.33	31.98	4.65				
4	1.60	4.00	31.98	36.51	4.53	4.59	0.110	68.7	
5	2.00	5.00	36.51	41.52	5.01				
6	2.00	5.00	41.52	46.84	5.32	5.17	0.125	62.5	

Comment: Red Star Yeast (as originally used in the fermentation) just dried for assay.

10/24/41

6/4/50
JMB

Riboflavin Assay No. 138

Gms. Sample 1.0000

Dilution 1 gm. → 250 ml. → 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms. / gm. yeast
1	1.20	3.00	0.03	3.72	3.69			out	59.2
2	1.20	3.00	3.72	7.23	3.51	3.60	0.086	71.6	
3	1.60	4.00	7.43	11.59	4.16				
4	1.60	4.00	11.59	15.77	4.18	4.17	0.099	61.9	
5	2.00	5.00	15.77	20.62	4.85				
6	2.00	5.00	20.62	25.20	4.58	4.72	0.113	56.5	

Comment: Fermentation (C) - 4° Brx to start - fed 50° Brx kept at 5:0 pH with NH₄OH.

10/24/41

6/6/50
MP

Riboflavin Assay No. 139

Gms. Sample 1.0000

Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{10\text{ ml.}}$ 100 ml.

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	mgms. chart	mgms. per gm. yeast	Avg. mgms/ gm. yeast
1	1.20	3.00	25.20	29.08	3.88	3.93	0.093	out — 77.5	(62.3)
2	1.20	3.00	29.08	33.05	3.97				
3	1.60	4.00	33.05	37.40	4.35	4.38	0.105	65.6	
4	1.60	4.00	37.40	41.81	4.41				
5	2.00	5.00	41.81	46.60	4.79	4.88	0.118	59.1	
6	2.00	5.00	0.00	4.97	4.97				

Comment: Fermentation (D) - 18° Brix at start - Constant 5.00 pH with 7N HCl.

Riboflavin Assay No. 140

One Sample 10000.

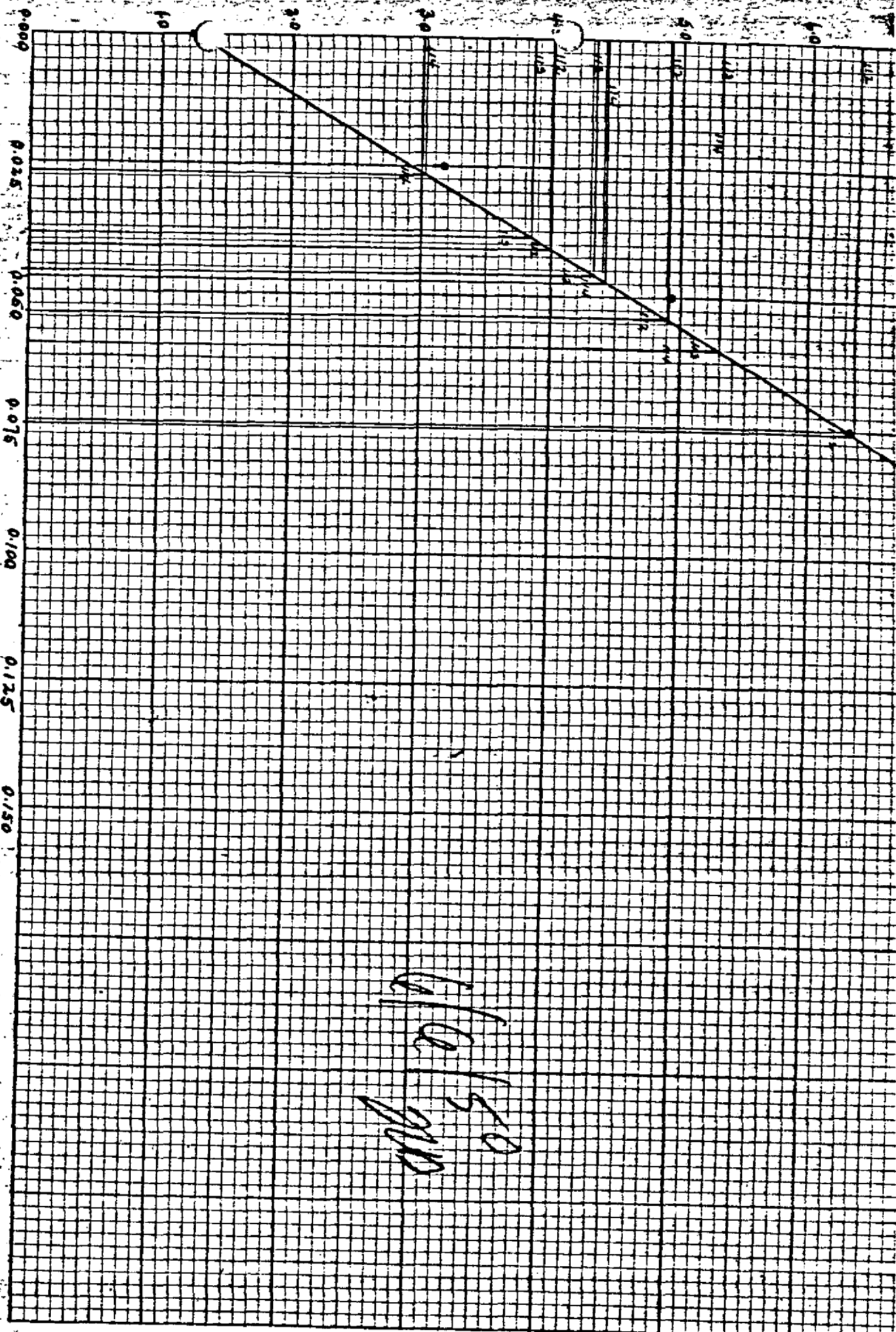
Dilution 1 gm. \longrightarrow 250 ml. $\xrightarrow{10 \text{ ml.}}$ 100 ml.

6/6/50
JMP

Tube No.	Yeast Extract		Buret Readings, ml.		ml. of 0.1 N NaOH		Riboflavin Found		
	mgms.	ml.	Initial	Final	Individual	Average	megs. chart	megs. per gm. yeast	Avg. megms/ gm. yeast
1	1.20	3.00	4.97	7.78	2.81				50.0
2	1.20	3.00	7.78	10.58	2.80	2.81	0.064	53.3	
3	1.60	4.00	10.58	14.01	3.43				
4	1.60	4.00	14.01	17.54	3.53	3.48	0.082	51.2	
5	2.00	5.00	17.54	21.73	4.19				
6	2.00	5.00	21.73	25.72	3.99	4.09	0.097	48.5	

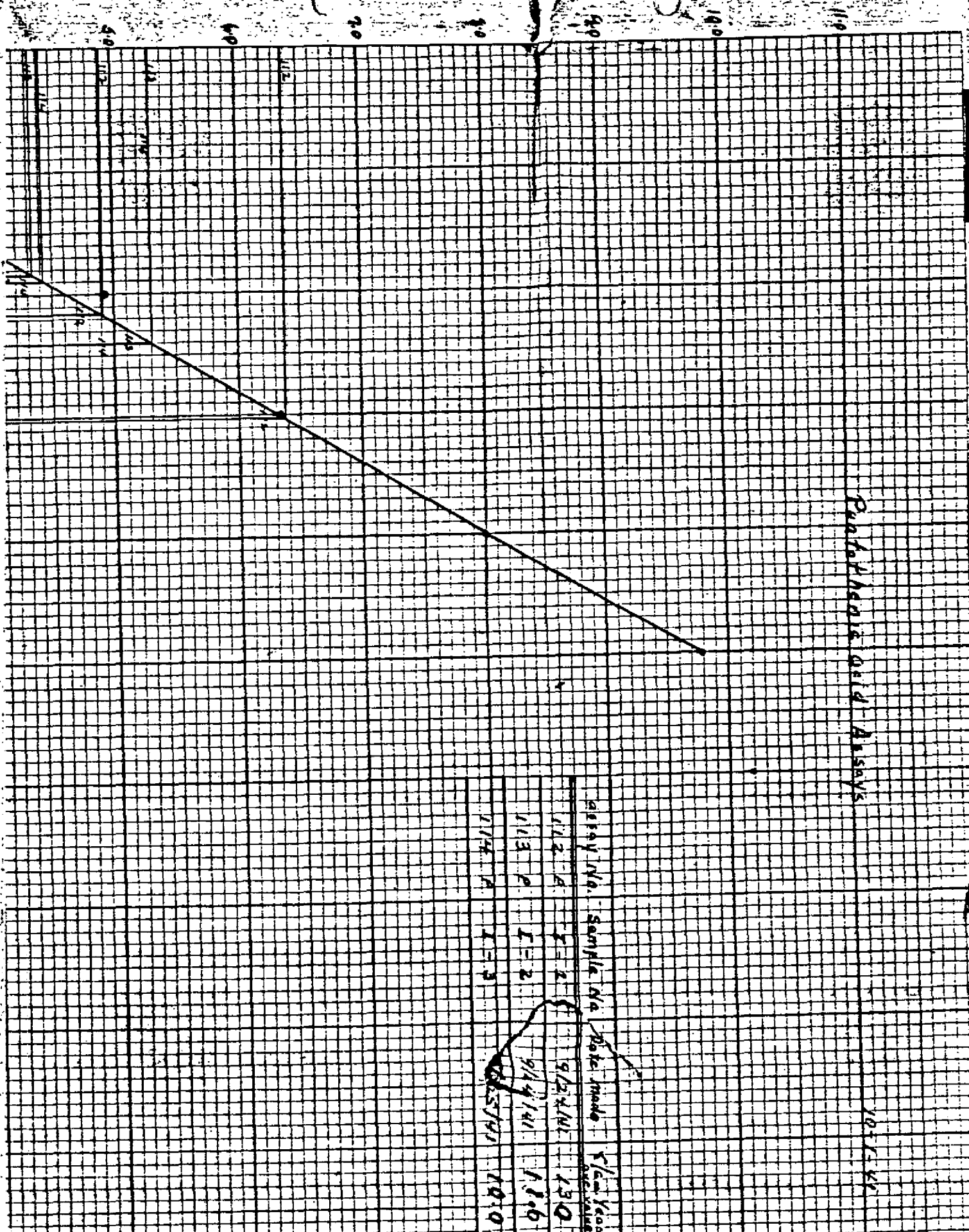
Comment: Fermentation (E) - 4° Brix to start - Fed 50° Brix
No NIN40N.

Microgram-p. Calcium parathyroids



Calcium

alkali



Phosphoric Acid Assays

10.0 ml

Sample No.	Date Made	Volume
112 A	9/24/41	15.0
113 A	9/24/41	18.0
114 A	9/24/41	20.0

Initial Final No. 34 Ave.

30.52	34.53	3.95	4.00
		4.07	
34.53	38.57		
38.57	44.13	5.56	4.91
44.13	48.39	4.26	
0.00	6.37	6.37	
6.37	12.77	6.40	6.39

12.77	16.81	4.04	3.85
16.81	20.46	3.65	
20.46	24.77	4.31	4.31
24.77	27.98	3.21	
27.98	33.51	5.53	5.30
33.51	38.57	5.06	

38.57	41.59	3.02	3.02
41.59	46.00	4.41	4.41
		5.53 <i>attn drop</i>	
0.02	5.56		
5.56	10.90	5.34	5.30
10.90	16.15	5.25	

Pantothene and (1, 12, 13)

Standard Curve

Initial	Final	ml. 0.1 N NaOH	ave
39.09	40.23	1.14	
40.23	41.55	1.32	1.23
41.55	45.00	3.45	
45.00	47.92	2.92	3.19
0.00	5.01	5.01	
5.01	9.83	4.82	4.92
9.83	15.59	5.66	
15.59	22.53	6.94	6.30
22.53	30.77	7.24	
30.77	39.51	8.74	7.99
39.51	49.28	9.77	9.77
0.00	10.29	10.29	10.03
10.29	20.11	9.82	
20.11	30.58	10.47	10.15

11/6/50
C.B.

Part time and

7/ chat 7/ am 7/ am

0.041 13.7

12.9

0.054 12.0

0.076 ~~9.5~~

0.033 12.7

11.6

0.047 10.5

0.060 ~~1.5~~

0.047 9.0

10.0

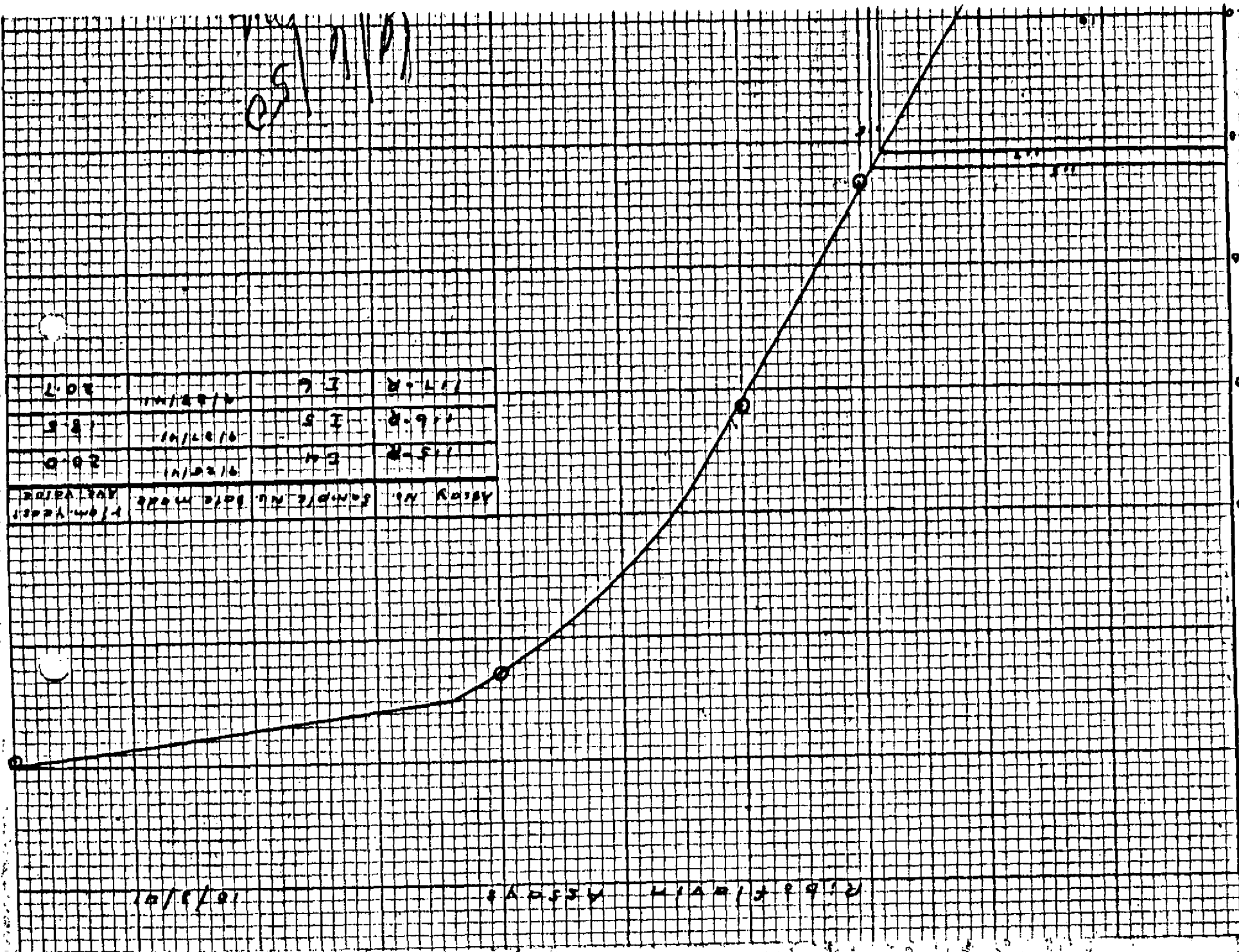
0.048 16.7

0.060 ~~1.5~~

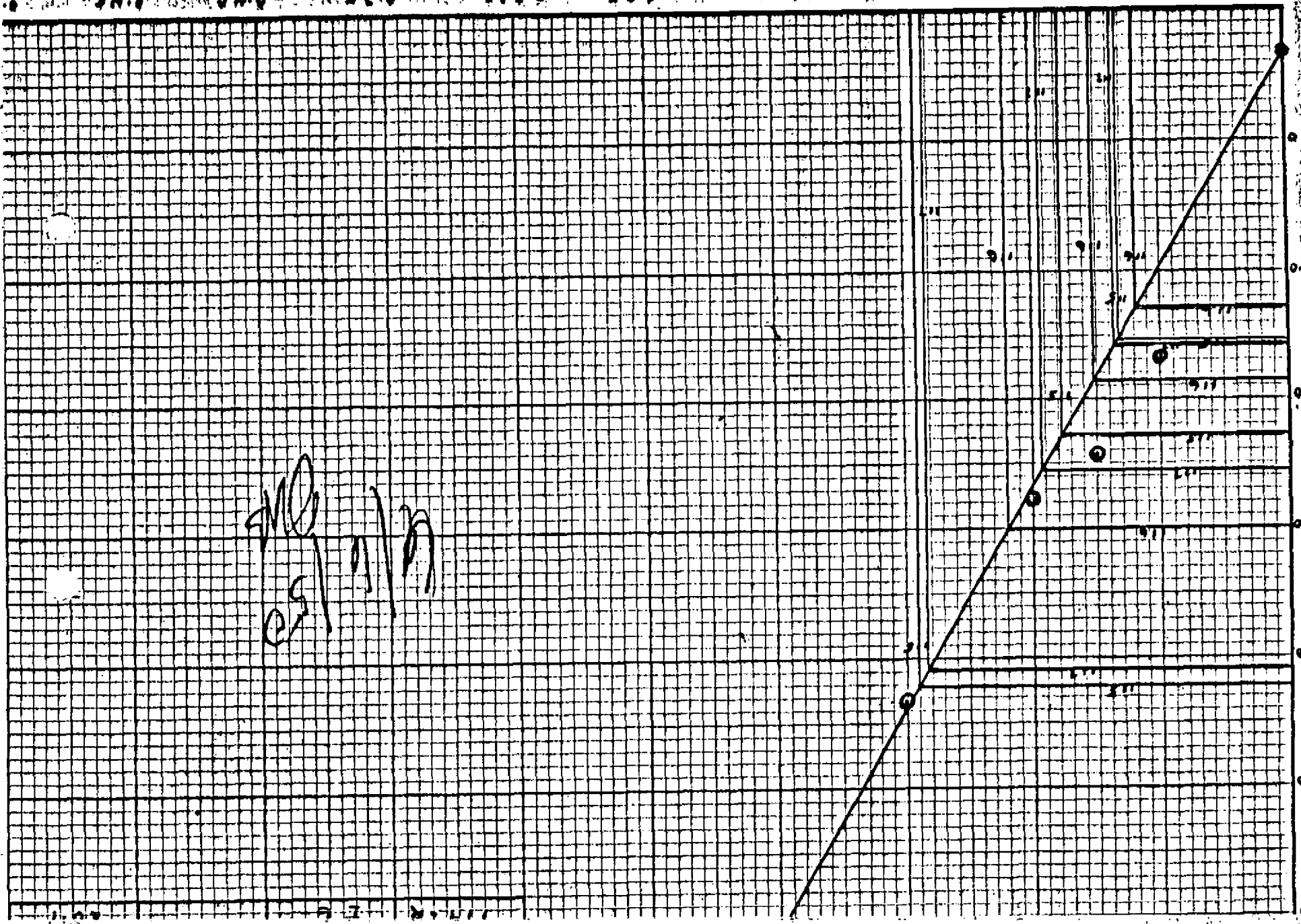
6/10/70

1.02	4/22/41	I 6	8.11
5.8	4/27/41	I 5	8.91
0.02	4/28/41	I 4	8.51
1.02 4/22/41 4/27/41 4/28/41 5.8 4/27/41 4/28/41 4/29/41 0.02 4/28/41 4/29/41 4/30/41			

2.162 f / 10/3/41



RIGHT DIVISION - MICROGRAMS / ml



Acid produced, ml. of 0.1 N

MS
ES

Reboflavine

Initial

Final

Neon

ave

9/25

19.22

21.76

2.54

0.66

333

21.76

24.50

2.54

22.0

2.54

24.50

27.62

3.32

0.89

3.27

27.62

30.83

3.27

19.8

30.83

36.14

5.31

446

5.27

36.14

41.26

5.12

18.3

9/27

41.26

43.50

2.24

0.59

19.7

2.2

43.50

45.79

2.29

17.3

2.8

45.79

48.60

2.81

0.77

0.00

2.87

2.87

4.13

3.8

2.87

7.00

4.13

0.11

13.8

7.00

10.87

3.8

9/28

10.87

13.42

2.55

0.68

22.0

2.07

13.42

16.01

2.59

0.97

21.6

3.0

16.01

19.46

3.45

14.0

17.7

19.46

23.10

3.64

23.10

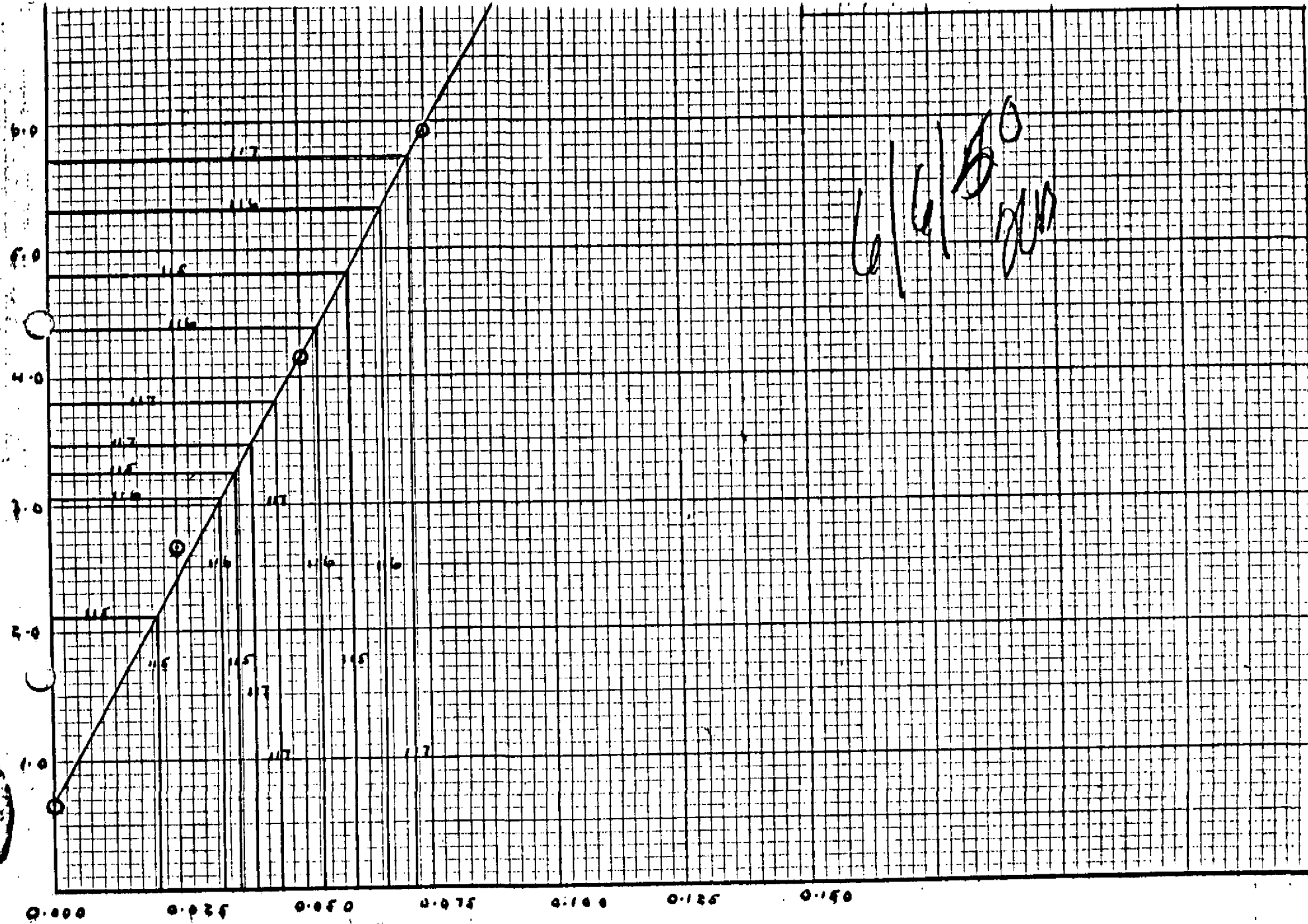
27.18

5.01

27.18

33.42

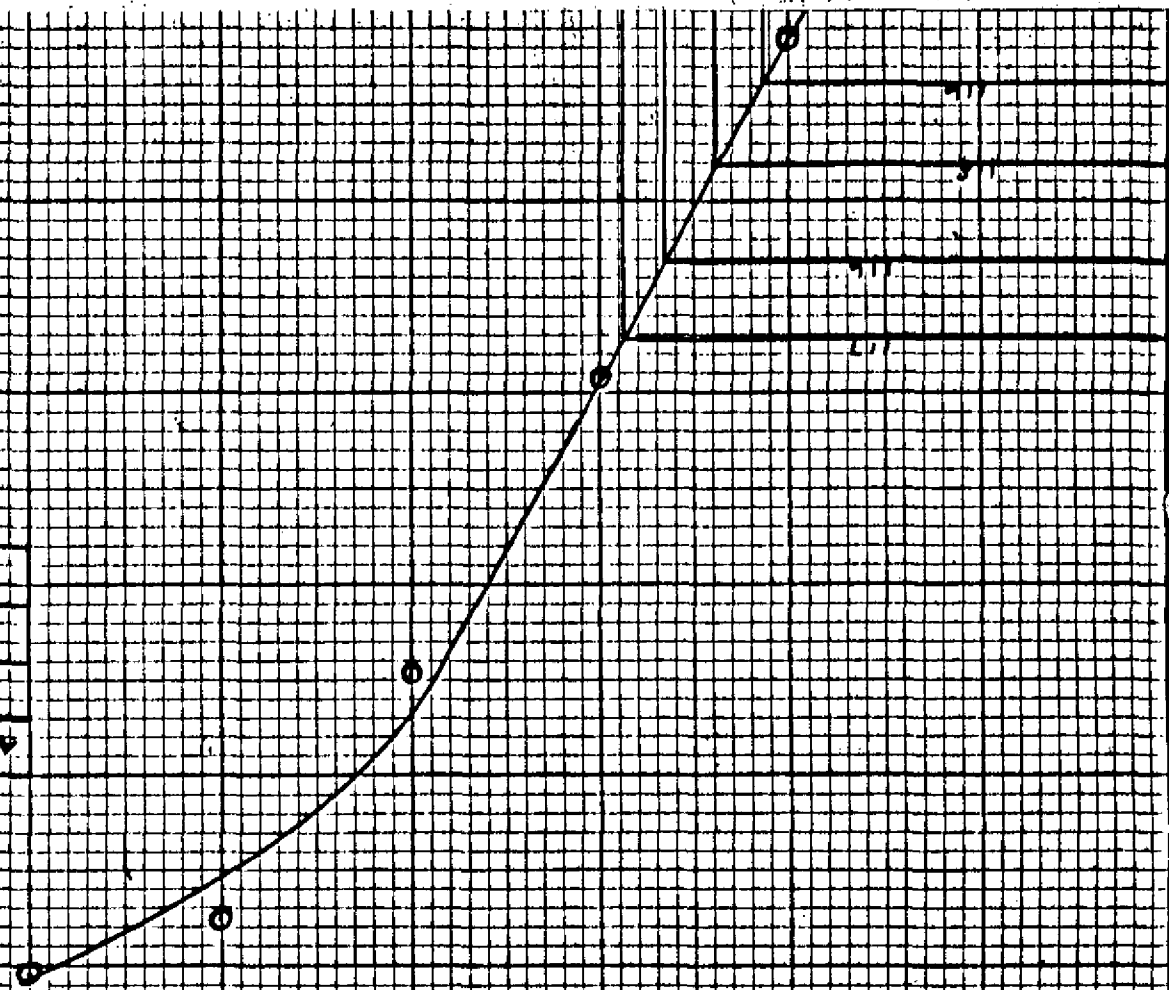
5.16



d-Calcium Pantothenate - micrograms / 10ml. media

0.9/1.7

11.0	15/82/0	9 2	11.7-12
11.5	14/82/4	9 3	11.6-12
12.1	14/82/0	11 2	11.5-12
10m. 10000	DATA MADE	NO. 10000	ASSAY NO.



PAINTING AND ASSAYS

10/2/41

Initial

Final

NEOH

77

33.42

35.50

2.08

2.84

35.50

37.64

2.14

37.64

41.01

3.37

8.2

41.01

44.13

3.12

10.60

44.13

48.97

4.84

2.5

0.00

4.77

4.77

4.81

37.59

46.59

4.00

11.5

41.89

43.68

2.09

11.3

43.68

43.01

4.33

0.53

0.00

4.42

4.42

11.8

4.42

9.67

5.21

0.67

9.67

15.06

5.39

8.4

15.06

19.01

3.95

13.3

19.01

22.02

3.01

22.02

25.73

3.71

10.2

25.73

29.63

3.90

29.63

35.38

5.75

0.72

35.38

41.83

5.70

9.4

Part of the ... dated ...

Standard Curve

Initial Final

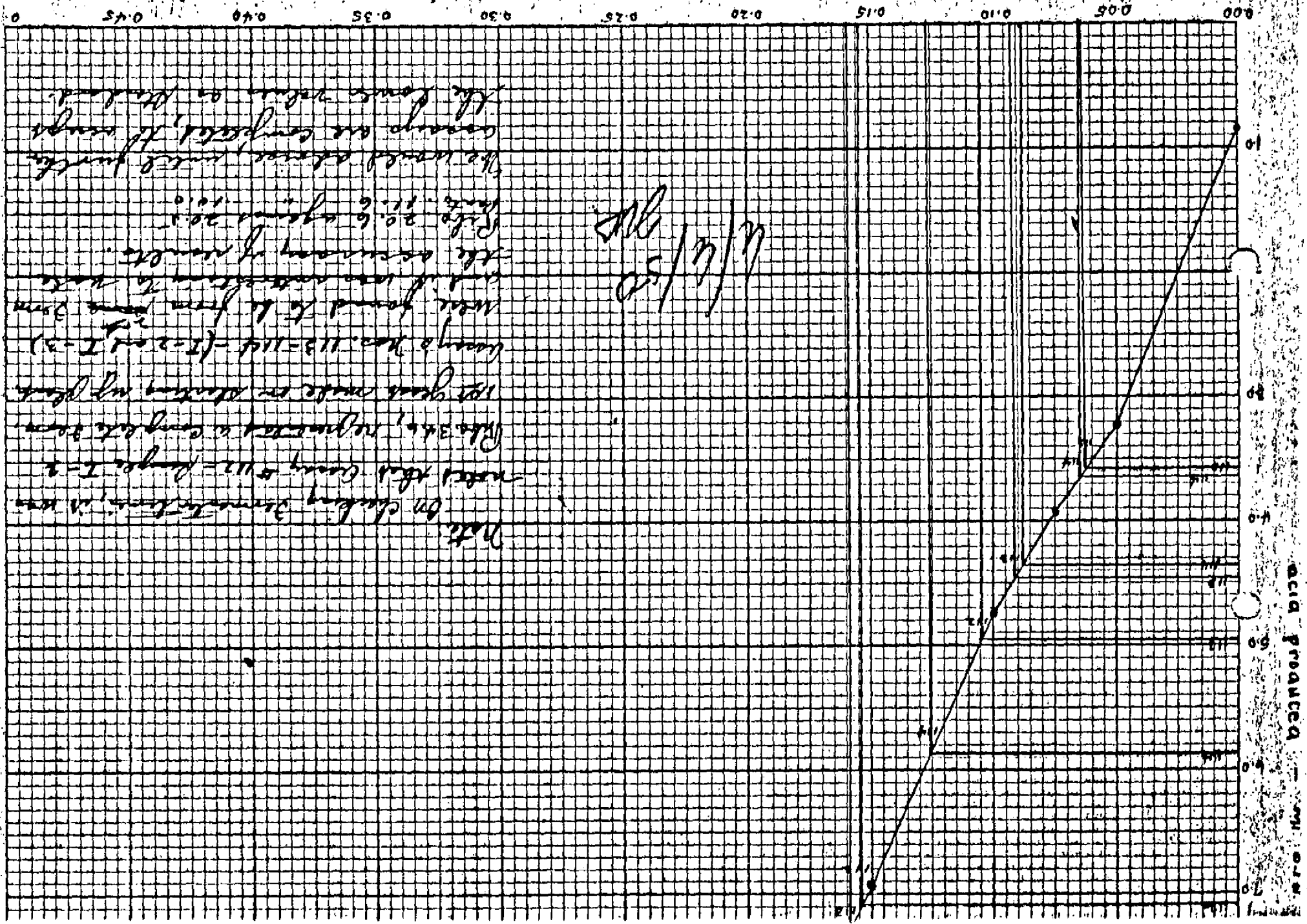
10 IN

W. H.

ave

4.77	5.40	0.63	0.68
5.40	6.12	0.72	
6.12	8.23	2.11	
8.23	11.58	3.35	2.68
11.58	15.81	4.23	
15.81	19.85	4.04	4.13
19.85	25.77	5.92	
25.77	31.74	5.97	5.93
31.74	39.40	7.66	
39.40	46.68	7.28	7.47
0.00	8.93	8.93	
8.93	17.52	8.59	8.76
17.52	27.37	9.85	
27.37	37.59	10.22	9.00

6/4/50
200



u/c/30

Note: On checking 3 measurements, 1.1 mM
 noted that during 5112 - Range I-2
 114.346, suggested a complete error
 112 spots made in plotting up plate.
 Average Nos. 113-114 - (I-2 and I-3)
 were found to be from same zone
 and it was necessary to make
 the averaging of results.
 Size 20.6 against 20.1
 the result above, units further
 compare are completed, it seems
 the lower values as standard.

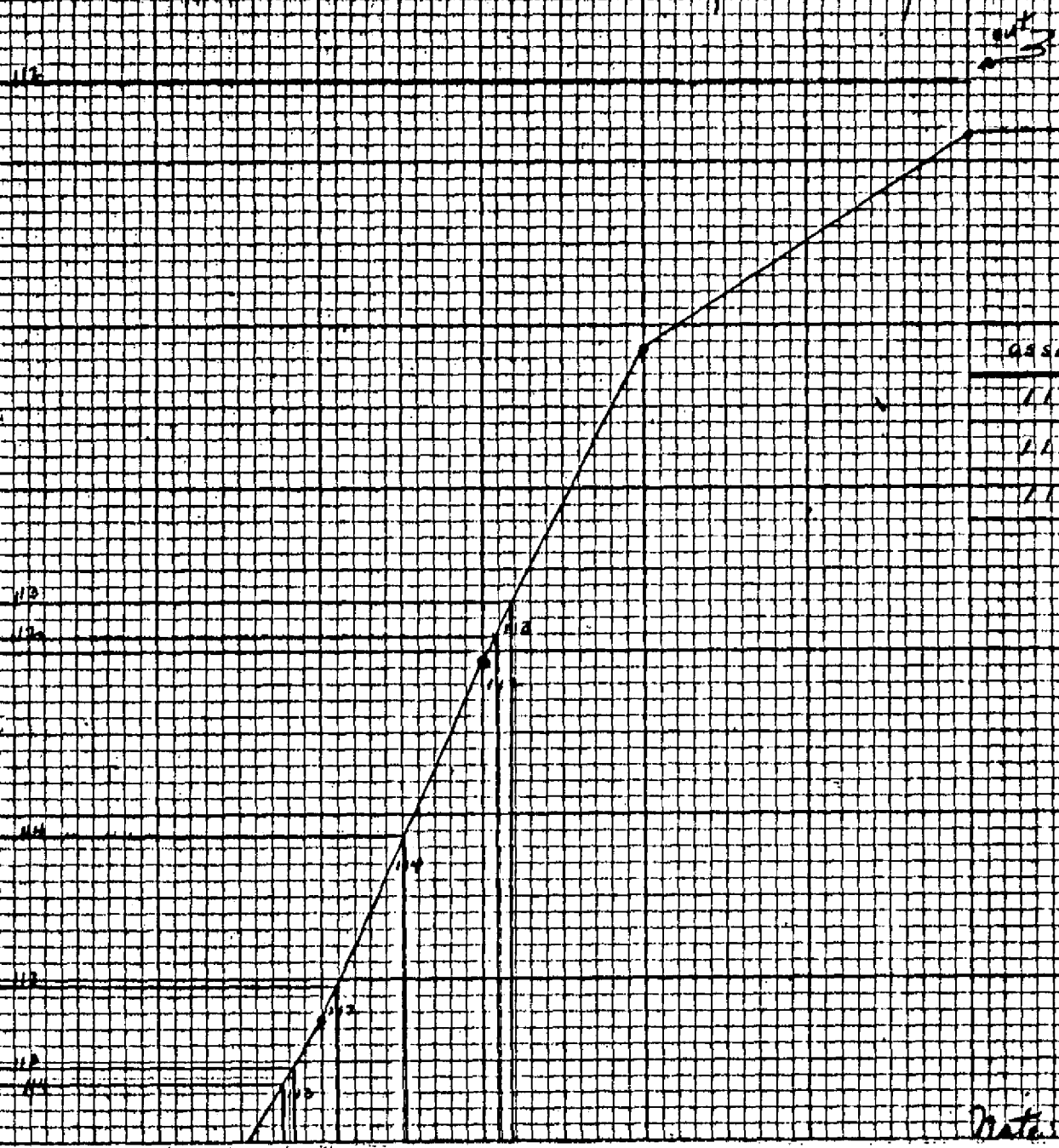
Riboflavin - micrograms/ml media.

Riboflavin Assays

10-1-41

acid produced - ml. 0.1N

11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0



assay no.	Sample No.	date made	Y/m. Yeast
112	I-1	9/24/41	34.6
113	I-2	9/24/41	20.6
114	I-3	9/25/41	20.5

Note